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A Seed Key to Some Common Weeds and Plants

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A SEED KEY TO SOME COMMON WEEDS AND PLANTS.

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INTRODUCTION.

The aim of this thesis is three-fold. Primarily, it is written to furnish a method of determining accurately the names of various seeds and seedlike fruits with the express purpose of detecting adulterants in commercial seeds. The key should also aid in determining plants in the fruiting condition when the flower parts are too far advanced for identification by the ordinary method. Further, it should serve as a check to determinations from a study of the flowers.

The terms "weeds" and "seeds" may be variously interpreted. A weed has been defined as "a plant out of place" or better still as a "useless or troublesome plant." Using the latter interpretation, the author chose those plants which were listed as troublesome weeds in the publications of various agricultural experiment stations. A few other wild plants were added and as special attention was paid to the adulterants of the seeds of Red Clover, White Clover, Alsike Clover, Alfalfa, Timothy, and Red Top, these seeds were inserted in the key. The term "seeds" was interpreted in the broad sense and includes not only true seeds but seedlike fruits such as are found on *Taraxacum officinale* Weber (Dandelion), *Arctium minus* (Burdock); etc. The botanical nomenclature used is the same as that found in the seventh edition of "Gray's New Manual of Botany" 1908.

LITERATURE.

Quite a few publications have been made in connection with seed study. The work of Harz seems to be the most thorough of these. It deals principally with the anatomy, histology and chemical properties of various seeds. The bulletin of W. J. Beal entitled "The Seeds of Michigan Weeds," 1910, gives accurate descriptions of the more common weeds of Michigan. Excellent illustrations by Mr. F. H. Hillman serve as a check

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to the descriptions. Mr. Hillman also is the author of Farmers' Bulletin 428, 1911, U. S. D. A., which gives valuable lists of adulterants of commercial seeds. He also has published numerous other bulletins but the author considers the above mentioned the most comprehensive. "The Seeds of the Blue Grasses," Bulletin 84 of Bureau of Plant Industry, U. S. D. A., 1905, by Edgar Brown and F. H. Hillman, includes a key to the seeds of six species of Poa as found in commercial seeds. Aside from this last mentioned paper, no literature has been found which concerns itself with a key which will aid in the systematic determination of different seeds.

METHODS OF STUDY.

The specimens studied were collected for the most part during the summer and fall of 1911. These were carefully labelled with the common and scientific names. An attempt was then made to describe each seed carefully, using the external characters which were most evident with the use of an ordinary hand-lens. From these descriptions and with the use of the specimens constantly for reference, the key was constructed. Drawings were used in preference to photographs because it was believed that by them the distinguishing characters could be brought out to a better advantage. The seeds of the grasses were described as they appear with the glumes or scales removed, at least where these are easily removed by rubbing between the thumb and fore-finger. Seeds vary considerably and where there was any doubt as to which one of two descriptions would serve, the seed was entered under both headings. In this way the opportunities of misinterpretation were minimized. A given seed may be entered many times, due to its variations. This might appear to be a bad condition of affairs and lead one to believe that better distinguishing characters might have been chosen. A trial of the key in actual testing, however, should prove to the individual that the arrangement into distinct groups according to size facilitates the quick determination of a seed. It should be noted that even in the most complex instance but twenty steps are required to make the determination.

THE USE OF THE KEY.

To secure satisfactory results, the key should be used with the drawings as a guide to correct interpretation. To determine a given seed, first rub it vigorously between the thumb and fore finger to remove any loose scales or flower parts which may be adhering. Now determine the length in milimeters exclusive of any *fragile* terminal appendage and turn to the group which would include a seed of that length. In this group are two other groups numbered (II). Determine in which of these the seed belongs and continue in a like manmanner until the name of the seed is found. If any character is not plain turn to the picture of a seed described as having that character.

The writer wishes to thank Prof. W. W. Rowlee, Dr. H. B. Brown and Mr. H. P. Brown for advice and criticism during the progress of the work.

Descriptions of Seeds Given in the Key.

Abbreviations: (L)=Length; (W)=Width; (C)=Color; (S)=Shape; (O)=Occurence as an adulterant.

1. *Digitaria sanguinalis* (L.) Scop. Crab Grass, Finger Grass. L. 1.8—2.2 mm. W. .6—.8 mm. C., light straw to brown or dull green. S., broad spindle shaped to blunt especially at the base; boat shaped; the scar on one side running about one-half the length of the seed: outer chaff usually present, the outer scale being as long as the seed and three-ribbed, the inner about one-half the length of the seed. "Edges of floral groove smooth" Beal. O., sometimes very troublesome, common in clover grass and alfalfa seeds. Introduced from Europe. For drawing see Harz p. 1258, fig. 166, XXIII-XXV.

2. *Panicum capillare* L. Old Witch Grass, Tickle Grass, L. 1.2— 1.8 mm. W. .8—1.5 mm. C., greenish yellow, glossy, dark in the middle and lighter at the ends. S., oval to elliptic and slightly flattened; glume with five fine longitudinal nerves, inner glume with two fine longitudinal lines. O., a common tumbleweed, common in alfalfa and the grasses; rather unimportant. Native.

3. *Echinochloa cruss-galli* (L) Beauv. Barn-yard Grass. L. 2.2— 3.2 mm. W. 1.3— 2.8 mm. C., shining gray brown to

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straw colored. S., oval in outline with one side flat and the other convex; surface smooth. O., common, especially on waste ground, in gardens, etc. Native.

4. *Setaria glauca* (L) Beauv. Yellow Fox-tail, Pigeon Grass. L. 2.5— 3.4 mm. W. 2.—2.8 mm. C., dark brown or straw colored. S., flattened oval, tapering almost equally at each end: one side flat or sometimes slightly concave, the other side quite convex. The concave side has coarser ridges, the flat side being occupied by a sunken area. At one end, a slight elevation is evident. Surface covered with minute lateral striations. The extremities are blunt and the seed is widest at the middle. O., very common in gardens, bothersome; commonly found in alfalfa, red clover and many other kinds of farm seeds. Introduced from Europe.

5. *Setaria viridis* (L) Beauv. Green Foxtail, Bottle-grass, Green Pigeon Grass. L. 1.8— 2.5 mm. W. 1.2— 2. mm. C., dull pale green to gray-brown often mottled with black. S., oval, flattened on one side and concave on the other; surface with fine longitudinal and transverse striations and a small rounded projection at the basal end: resembles *Setaria glauca* but is smaller and differs in that the flat side lacks the sunken area. O., common in many farm seeds much the same as *Setaria glauca*. Especially common in alfalfa, timothy and red clover seeds. Introduced from Europe.

6. *Phleum pratense* L. Timothy, Herd's Grass, L. 1.2— 1.8 mm. W. .7— 1. mm. C., light straw to yellow. S., broad fusiform with the base slightly oblique and the surface reticulated with oblong ridges or shallow pits. O., common in grass lands, cultivated. Introduced from Europe.

7. *Agrostis alba.* L. White Marsh Bent Grass, Red Top, Herd's Grass, Fiorin. L. .8— 1.2 mm. W. .4— .7 mm. S., spindle shaped, almost elliptical, broad with one end pointed and the other rounded; scar short and rounded and not more than ¼ the length of the seed: palea two-nerved and lemma three-nerved, nearly equalling the glumes. O., common in grass lands and cultivated. Introduced from Europe. See Harz, p. 1262, fig. 167, I-IV.

8. *Eragrostis megastachya* (Koeler) Link. Stink Grass, Snake Grass. L. 4—8 mm. W. .3—.5 mm. C. red-yellow

to dark brownish red. S., broadly oval and slightly flattened with each end slightly pointed; very finely netted with dark lines. O., common in waste land. See Beal. Fig. 15. Introduced from Europe.

9. *Poa pratensis* L. June Grass, Spear Grass, Kentucky Blue Grass. Length of floret 3.0— 4.4 mm., of the seed 1.1— 1.5 mm. Width of seed .4— .8 mm. C., light brown. S., equally three-sided in cross section with a shallow groove on one side; surface finely hairy at the angles; angles quite distinct; quite long and attenuate at the apex. Introduced from Europe.

9a. *Poa compressa* L. Canada Blue Grass. This grass very closely resembles *Poa pratensis* L. and is used as an adulterant of the same. According to Hillman and Brown, Bull. 84, U. S. D. A., Bureau of Plant Industry, it differs principally in that the intermediate veins of the glumes are distinct in *Poa pratensis* L. and indistinct in *Poa compressa* L.

10. *Glyceria nervata* (Willd) Trin. Fowl Meadow Grass, Beard Grass. L. .6— 1. mm. W. .4— .5 mm. C., black with silvery reticulations. Very broadly elliptic or spindle-shaped with a short acutely tipped apex; base with a short blunt tip; surface irregularly wrinkled. O., common in marshy regions; found in seeds of alsike clover. Introduced from Europe.

11. *Bromus secalinus* L. Chess, Cheat. L. 5.8— 7.2 mm. W. 2.2—2.9 mm. C., dark brown or flesh colored. S., oval, at least in general outline, very deeply heart-shaped in cross section or spindle-shaped with a broad very deep groove up one side: "floral glume rounded on the back and obscurely seven nerved; palea with a single row of stiff hairs; club-shaped rachilla distinguishes it from the cultivated grasses." Hillman. O., common in seeds of cereals and large seeded grasses especially in orchard grass; sometimes found in the clovers. See Beal, fig. 7. Introduced from Europe.

12. *Laportea canadensis* (L) Gaud. Wood Nettle. L. 2.8— 3.8 mm. W. 2.5— 3. mm. C., dark brown to black. S., almost circular but with two short projections on the edge rather near each other but diverging, pronouncedly flattened. O., not a bad weed in crops but common in lowlands. Native.

13. *Rumex crispus* L. Narrow-leaved or Curled Dock. L. 1.2— 2.2 mm. W. .7— 1.4 mm. C., dark brown to reddish

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brown. S., triangular in cross section with acute angles; abruptly obtuse at the base and rather attenuate at the apex (not as attenuate at the apex as *Rumex obtusifolius*). O., the commonest Rumex in farm seeds, found chiefly in blue grass, orchard grass and red clover. Introduced from Europe.

14. *Rumex obtusifolius.* L. Broad leaved or Bitter Dock. L. 1.8— 2.4 mm. W. .8— 1.4 mm. C., light reddish brown or tan and shining. S., triangular in cross section; rather attenuate at the apex and more contracted at the base; sides convex or slightly so; angles near the base slightly concave, near the apex convex. O., sometimes found in farm seeds. Introduced from Europe.

15. *Rumex Acetosella* L. Field or sheep sorrel. L. 1.2— 1.8 mm. W. .8 —1.4 mm. C., shining reddish brown. S., three-sided in cross section, abruptly tapering to a point at the apex and rounded at the base; angles rounded and sides convex. O., common in red clover, orchard grass and timothy. Native.

16. *Polygonum aviculare* L. Knot Grass, Knot-weed. L. 1.8—2.4 mm. W. .8—1.4 mm. C., dull reddish brown. S., unequally three-sided, tapering at the apex to a long acuminate but at length rounded point; base moderately tapering to a rounded point; angles rather abrupt and rounded; surface finely granular in longitudinal striations. O., of minor importance as a field weed although often found as an adulterant of red clover. Native.

17. *Polygonum Persicaria* L. Lady's Thumb. L. 2.—2.8 mm. W. 1.7—2. mm. C., shining jet black. S., broadly oval or round with a short point at the apex and a short projection at the base; flattened, although the faces are more or less concave. O., common in various kinds of farm seeds especially in red clover. Introduced from Europe.

18. *Polygonum virginianum* L. Virginia Knotweed. L. 3.4—4.4 mm. W. 1.8—2.4 mm. C., shining chestnut brown. S., chestnut shaped but more attenuate at the base, oval in general outline; surface smooth and highly polished. O., common in low and waste grounds. Native.

19. *Polygonum Convolvulus* L. Wild Buckwheat, Black Bindweed. L. 2.5—3.5 mm. W. 1.8—2.3 mm. C., dull jet

black. S., triangular in cross section tapering at both ends to a somewhat attenuate point; faces somewhat concave. O., common in all kinds of farm seeds from all sources, particularly in the seeds of cereals, millet and flax. Introduced from Europe.

20. *Polygonum scandens.* L. Climbing False Buckwheat. L. 3.5—7.2 mm. W. 3.—4.8 mm. C., shining jet black. S., triangular in cross section, tapering almost equally at each end to a point; faces slightly concave; angles slightly rounded. O., not common. Introduced from Japan.

21. *Chenopodium hybridum* L. Maple-leaved Goosefoot. L. 1.2—2.2 mm. W. 1.2—2.2 mm. Thickness .4—.6 mm. C., shining black or gray. S., almost round with a shallow notch on one side; sides equally convex; a groove on one side leading from the notch to near the center. O., not very common, but often found on waste land. Native.

22. *Chenopodium album* L. Lamb's Quarters, Pigweed. L. 1.—1.5 mm. W. .8—1.5 mm. C., dull black or shining or gray. S., circular except for a notch on one side; one face nearly flat, the other convex; the edge rounded. O., common in all kinds of farm seeds particularly clover and grass seeds. Introduced from Europe.

23. *Atriplex patula* L. Spreading Orache. L. 1.3—1.9 mm. W. 1.4—1.7 mm. C., black or dull dark gray speckled with light gray when the involucre is on; shining black with the involucre off. S., nearly circular with a slight notch on one side; face nearly flat; groove on one side running from the scar towards but not to the center. O., not common. Introduced from Europe.

24. *Amaranthus retroflexus* L. Rough Pigweed. L. .8—1.2 mm. W. .6—.9 mm. C., shining jet black or reddish if immature. S., obovate or broadly oval with a slight notch at one side of the narrower end; smooth surface very finely reticulated with fine lines when seen with a low-power microscope. "When seen edgewise the hem-like margin in this seed is less prominent than in *A. graecizans, A. hybridus* and *A. blitoides.*" Beal. O., common in various kinds of farm seeds, especially clover and timothy.

25. *Amaranthus hybridus* L. Slender Pigweed. L. 1.—1.5 mm. W. .8—1.4 mm. C., shining black unless immature and

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then reddish or purplish. S., broadly ovate or nearly circular; more pointed than *A. graecizans;* notch on one side of the narrower end; thickest in the middle, curving convexly to a rather acute angle. O., not important; introduced from Tropical America.

26. *Amaranthus graecizans* L. Tumble-weed. L. .6—1. mm. W. .4 —1.mm. Thickness about .3 mm. C., shining jet black. S., nearly circular, thick at the middle and tapering to a rather acute angle at the edge; a notch on one side and fine reticulations on the surface. O., common in farm seeds, especially clover. Introduced from Tropical America.

27. *Spergula arvensis* L. Spurry. Corn Spurry. L. 1.2—1.8 mm. W. 1.2—1.6 mm. C., black with a narrow yellowish wing and a few short yellowish spines. S., broadly lens shaped with a slight notch on one side, often with two notches close together at the hilum; surface with very minute shallow pits. O., found in grain fields and light sandy soil. Naturalized from Europe.

28. *Arenaria serpyllifolia* L. Thyme-leaved Sandwort. L. .3—.5 mm. W. .2—.4 mm. Thickness .2—.3 mm. C., grayish black or reddish brown, somewhat lead-colored. S., almost circular with the exception of a notch at one side; surface covered with about seven concentric or eccentric rows of oval-shaped elevations on each side. O., common in sand soil and found in many farm seeds. Introduced from Europe.

29. *Stellaria media* L. Cyrill. Common Chickweed. L. .8 —1.2 mm. W. .6—.9 mm. C., reddish yellow to brown. S., disc-shaped, round, almost as thick at the edges as at the center; surface covered with concentric rows of tubercle-like projections; a slight notch at one side at the scar. O., very common especially in imported and domestic clover seeds. Naturalized from Europe.

30. *Cerastium viscosum* L. Mouse-ear Chickweed. L. .6—.8 mm. W. .4—.6 mm. C., reddish yellow-brown with less red than in *Stellaria media.* S., somewhat circular or disc-shaped but quite angled, somewhat wedge-shaped; surface covered with concentric rows of tubercle-like projections more pronounced than in *Stellaria media.* O., common in small clover and grass seeds, "particularly in alsike and timothy from Canada" (Hillman). Introduced from Europe.

31. *Agrostemma Githago* L. Corn Cockle. L. 2.8—3.5 mm. W. 2.5—3.3 mm. C., dark brown to black. S., irregularly round with two broad shallow grooves following the outline of the cotyledons, quite angular; surface covered with numerous (about thirty) rows of short rounded elevations. O., "common in seeds of cereals, millets, vetches and flax from all sources" (Hillman). Introduced from Europe.

32. *Lychnis alba.* Mill. White Campion. L. 1.2—1.8 mm. W. 1.2—1.4 mm. C., dusty yellow with numerous black topped tubercles. S., short kidney-shaped with about fifteen rows of tubercles on each side, base of tubercles not notched as in *Silene noctiflora* L. O., rather common along roadsides. Introduced from the Old World.

33. *Silene noctiflora* L. Night-flowering Catch-fly. L. 1.2—1.8 mm. W. 1.—1.3 mm. C., gray-brown with a slight reddish or pink tinge. S., very short kidney-shaped; flattened especially on one side; surface covered with concentric rows of glandular-like structures. O., common and often abundant in seeds of red and alsike clovers. Introduced from Europe.

34. *Saponaria officinalis* L. Soapwort or Bouncing-Bet. L. 1.8—2.4 mm. W. 1.8—2.4 mm. C., dark bluish black. S., short kidney-shaped to circular with a notch on one side; surface covered with concentric rows of tubercle-like projections. O., sandy land and roadsides; in various farm seeds. Naturalized from Europe.

35. *Portulaca oleracea* L. Purslane, Pussley. L. .5—.8 mm. W. .3—.6 mm. C., shining black or sometimes with a purplish tinge. S., broadly ovate, flattened; sometimes almost circular but usally quite pointed near the scar; surface covered with numerous shallow cavities; one large cavity running from the scar back along the seed. O., very common in gardens and in waste lands. Introduced from the southwest.

36. *Ranunculus abortivus.* L. Small flowered Crowfoot. L. .8—1.4 mm. W. .6—1.2 mm. C., light yellowish brown. S., lenticular in cross section, slightly winged around the margin: a beak at the end short and curved; surface wrinkled radially around the margin. O., not particularly common but very abundant in certain regions. Introduced from Europe.

37. *Ranunculus acris* L. Tall Crowfoot or Tall or Bitter Buttercup. L. 2.5—4. mm. W. 2.5—3.5 mm. C., dark brown

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or yellowish brown. S., obovate or ovate with a slight curved beak at the apical end and a narrow wing around the edge; base set obliquely to the longitudinal axis of the seed; one side convex, the other nearly flat; thin. O., common in lowlands and fields. Introduced from Europe.

38. *Lepidium ruderale* L. Pepper Wort, Pepper Grass. L. 1.4—1.8 mm. W. .6—1. mm. C., tan to yellow-brown. S., obovate, narrowly winged; narrower at the apical end thus differing from *Arabis laevigata;* with a groove running down each side from the scar. O., common in clovers and grasses. Introduced from Europe.

39. *Capsella Bursa-pastoris.* L. Medic. Sheperd's Purse. L. .5—1.2 mm. W. .2—.8 mm. C., yellow to reddish brown. S., flattened oblong with a longitudinal groove running in a loop from the base for nearly the whole length of the seed. O., common in white, alsike and red clovers, also in blue grass, a pest in alfalfa. Introduced from Europe.

40. *Brassica nigra.* (L) Koch. Black Mustard. L. 1.—1.8 mm. W. 1.—1.6 mm. C., dark reddish brown with a network of lighter lines. S., only slightly flattened spherical; sometimes a trifle angular; surface pitted and covered with a network of ridges. O., found in clovers and grass seeds. Introduced from Europe.

41. *Sisymbrium officinale* (L) Scop. Hedge Mustard. L. .8—1.5 mm. W. .3—.8 mm. C., tan or yellowish, greenish brown. S., quite irregularly oval to oblong, usually more blunt at the apical end and tapering at the base; a curving line from the scar down one side follows the outline of the cotyledons. O., a rather common weed. Introduced from Europe.

42. *Barbarea vulgaris.* R. Br. Common Wild Mustard. L. .8— 1.7 mm. W. .6— 1.2 mm. C., light brown shining slightly under the microscope. S., flattened oval, irregular and with a distinct elevation at the scar; surface sparingly covered with a network of fine ridges or pits. Differs from *Brassica nigra* in being lighter in color, flatter and in having less pronounced ridges or pits. O., common in fields and gardens and in many seeds. Introduced from Europe.

43. *Arabis laevigata* Muhl Poir. Rock Cress. L. 1.5— 1.8 mm. W. .8— 1. mm. C., tan to yellow-brown. S., flattened oval to oblong with a small hook at the blunt end; with a

groove extending from the hook back along the sides showing the location of the cotyledons; winged around the margin; broadest toward the apical end. O., not a remarkably bad weed but rather common. Native.

44. *Potentilla monspeliensis* var *norvegica* L. Rydb. Cinquefoil, Five Finger. Length .6— 1. mm. W. .6— .9 mm. C., light yellowish brown sometimes slightly shining. S., nearly round except for a short straight area on one side; sometimes flattened and lens-shaped in cross section; surface covered with numerous forked ridges or wrinkles. O., common in alsike clover and in timothy. Introduced from Eurasia.

45. *Agrimonia striata* Michx. Tall Agrimony. Length of fruit 5. —10. mm. including the hooked prickles. W. 4. —8. mm. C., reddish brown. S., turbinate or top-shaped with a crown of hooked prickles; lower part with about fifteen longitudinal flutings; fruit two-celled and two-seeded; the lower part slightly hairy. O., not a bad weed. Introduced from Eurasia.

46. *Trifolium pratense* L. Red Clover. L. 1.5— 2. mm. W. 1.— 1.4 mm. C., light yellowish to bluish brown. S., somewhat triangular to ovoid; flattened; scar near the center of one edge; differs from *Medicago lupulina* in not having the prominent elevation at the scar. O., cultivated. See Hillman. Introduced from Europe.

47. *Trifolium repens.* L., White Clover. L., .8— 1.4 mm. W., .8— 1.1 mm. C., yellow to brownish red. S., somewhat shield-shaped; flattened; with a groove extending for a short distance from the straight or concave end; one end rounded. O., cultivated. Introduced from Eurasia.

48. *Trifolium hybridum* L. Alsike Clover. L., .8— 1.6 mm. W., .5—1.4 mm. C., dark yellowish green to black. Shape, almost identical in shape with *Trifolium repens* differing from it principally in the color. O., cultivated. Introduced from Europe.

49. *Melilotus alba* Desr. White Melilot or Sweet Clover. L., 2.—2.4 mm. W., 1.2—1.5 mm. C., dull greenish brown to greenish yellow, usually quite light colored. S., smooth and very nearly truly elliptical, with a broad shallow notch near one end; has a peculiarly sweet odor. O., found in alfalfa and red clover. Introduced from Europe.

50. *Medicago sativa* L. Alfalfa, Lucerne. L., 1.8—2.5 mm. W., 1.—1.4 mm. C., greenish yellow to brown. S., kidney-shaped to diamond-shaped with edges less rounded than in *Melilotus alba;* slightly thinner and larger than *Medicago lupulina* and without the prominent elevation near the scar. O., widely cultivated. Introduced from Europe.

51. *Medicago lupulina* L. Yellow Trefoil, None-such, Black Medick. L., 1.5—2.4 mm. W., .7—1. mm. C., yellowish green or brown. S., flattened oval especially near the scar; with an elevation near the scar extending beyond the general outline of the seed. O., found especially as an adulterant in alfalfa. Introduced from Europe.

52. *Amphicarpa monoica* (L.) Ell. Hog Peanut. L., 4.2—5.8 mm. W., 3.2—4.8 mm. C., purplish black mottled with gray. S., short flattened oval with the hilum on the edge; surface smooth. O., not a bad weed; common in thickets growing over other weeds. Native.

53. *Rhus Toxicodendron* L. Poison Ivy. L., 3.—5.8 mm. W., 2.8—5. mm. C., white or nearly so. S., fruit nearly globular, seed somewhat kidney-shaped with two flutings on each side. O., common in rocky and swamp places, shrubby or climbing; poisonous. Native.

54. *Impatiens biflora* Walt. Spotted Touch-me-not. L., 3.8—5.8 mm. W., 2.—3.5 mm. C., usually quite dark reddish brown. S., oval with a slight beak on one end and four or sometimes five narrow longitudinal ridges on the sides; somewhat flattened with two ridges on the outer face and one down each face; surface somewhat wrinkled. O., common in damp places and spreading quite rapidly. Native.

55. *Abutilon Theophrasti.* Medic. Indian Mallow, Velvet Leaf. L., 3.2—4.4. mm. W., 2.6—3.4 mm. C., graying brown. S., somewhat kidney-shaped to ovoid; resembling Datura but having a much more pronounced notch; flattened. O., flat waste lands and in pastures. Introduced from India.

56. *Malva rotundifolia* L. Common Mallow, Cheeses. L., 1.2—2.2 mm. W., 1.2—1.8 mm. C., light greenish brown. S., nearly circular except for a notch on one side; flattened and slightly thinner on the side next the notch; seeds borne in disc-like fruits. Introduced from Europe.

57. *Malva moschata* L. Musk Mallow. L., 1.8—3.2 mm. W., 1.6—3. mm. C., fruit dark gray or brown appearing silvery because of numerous hairs, seeds resembling *Malva rotundifolia* but lighter in color. S., short kidney-shaped or circular with a notch on one side and a space of apparently different texture in the center. O., common in fields and meadows. Introduced from Europe.

58. *Hypericum perforatum* L. Common Saint John's Wort. L., .5—1.2 mm. W., .2—.5 mm. C., dark brown, shining. S., abruptly tapering or rounded at the ends; cylindrical; surface covered with longitudinal rows of minute (about twenty in a row), indented scales or rectangular markings. O., very common and troublesome. Introduced from Europe.

59. *Oenothera biennis* L. Common Evening Primrose. L., 1.1—2.2 mm. W., .5—1.5 mm. C., brick red. S., very irregularly 4—6 sided, usually sharp angles and flat faces; angles often winged; surface minutely ridged or wrinkled. O., quite common in pastures, common in timothy and found in clover. Native.

60. *Carum Carvi* L. Caraway. L., 2.8—4.4 mm. W., .7—1.4 mm. C., rich yellowish red with six lighter longitudinal ridges. S., somewhat fusiform with one side slightly concave and the other broadly convex; with six longitudinal ridges. O., not a bad weed, sometimes cultivated. Introduced from Europe.

61. *Daucus Carota* L. Wild Carrot. L., 1.5—4.8 mm. W., .8—2. mm. C., light greenish brown with lighter stripes. S., flattened hemispherical, oval, with a row of frail edges along the acute edges and from two to five rows of still more frail spines running from end to end on the convex surface; very variable in size and shape; in commercial seeds the spines are often rubbed off. O., common in red clover and in imported alfalfa seeds. Introduced from Europe and spreading rapidly.

62. *Asclepias syriaca* L. Common Milkweed. L., 6.—8. mm. including the wing. W., 3.—4.2 mm., including the wing. Thickness, .8—1.2 mm. C., light reddish brown. S., ovate, much flattened; the base abruptly truncate; one side slightly concave and bearing a slight keel in the center extending for about one-half the length of the seed; with minute appressed hairs. O., troublesome in pastures.

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63. *Cuscuta Gronovii* Willd. Gronovius Dodder. L., 1.4—1.9 mm. W., 1.2—1.8 mm. C., dark brown, granular, dull, sometimes yellowish. S., almost globular, closely resembling clover seed but more close and compact; embryo in a spiral; without a noticeable concavity at the scar. O., very common in lowlands. Native.

64. *Cuscuta epithymum* Murr. Clover Dodder. L., .6—1.2 mm. W., .7—1. mm. C., variable, usually dusty light brown to black. S., irregularly spherical with distinct shallow pits when seen through a hand microscope; usually with a fairly distinct scar at point of attachment; often with two adjacent flattened areas near the scar. O., quite common in clover and alfalfa.

65. *Cuscuta arvensis* Beyrich. Field Dodder. L., 1.—1.8 mm. W., .8—1.5 mm. C., quite light pinkish yellow or flesh colored, rarely dark brown; with a grayish dusty appearance under the microscope. S., irregularly spherical; almost invariably with two or three adjacent flattened areas on one side and with the other side rounded regularly. Surface of a granular appearance. Embryo curled. Surface not prominently pitted as in *C. epithymum* Murr. Much lighter in color than *C. Gronovii* Willd. O., found occasionally in red clover. Introduced from Europe.

66. *Lappula virginiana* (L.) Greene. Stickseed, Beggar's Lice. L., 3.—4.4 mm. W., 2.—2.9 mm. C., dark brown to black. S., broadly ovate with spines on one side and about four ridges radiating from an ovate ridge on the other, spines with bulbous tips. O., abundant along roadsides and found as an adulterant of red clover seed. Native.

67. *Lithospermum arvense* L. Corn Gromwell, Wheat Thief, Red Root, Stoneseed. L., 2.5—3.8 mm. W., 1.8—2.2 mm. C., light gray-brown with a dark area at the base, dull. S., turbinate or somewhat spherical with a long drawn out protuberance at the apical end and a slight keel on the back surface; base truncate with two minute tubercles visible to the naked eye; very hard. O., found in seed of red clover, alfalfa, cereals, grasses, etc. Naturalized from Europe.

68. *Verbena urticaefolium* L. Nettle-leaved Vervain. L., 1.5—2.2 mm. W., .5—.9 mm. C., dull dark reddish brown with a pronounced white spot at one end. S., oval to oblong,

somewhat four-angled, shorter and broader than *Verbena hastata*. O., common along roadsides and found as an adulterant of red clover. Native.

69. *Verbena hastata* L. Blue Vervain. L., 1.7—2.4 mm. W., .4—.7 mm. C., dull reddish brown. S., oblong to cylindrical; one side very convex and with about five narrow longitudinal ridges, the other side made up of two plane faces set at an angle of about 40 degrees and with a white scar at one end; shorter and broader than *Verbena urticaefolium*. O., common in some clovers. Native.

70. *Nepeta Cataria* L. Catnip, Cat Mint. L., 1.3—1.7 mm. W., .8—1.2 mm. C. and S., dull red with two oval-shaped white cavities placed end to end near one end of the seed, the cavities being filled with a white cottony substance; broadly oval and slightly compressed. O., very abundant but not dangerously common in clover seeds. Introduced from Europe.

71. *Prunella vulgaris* L. Self Heal, Heal All, Carpenter Weed. L., 2.—2.6 mm. W., .9—1.2 mm. C., shining light or dark brown. S., slightly flattened oval tapering at one end to a small triangular whitish appendage; with two dark longitudinal lines on each side. O., one of the commonest impurities of clover, alfalfa and grass seeds. Introduced near Washington from Europe.

72. *Leonurus Cardiaca* L. Common Motherwort. L., 2.—2.5 mm. W., .8—1.2 mm. C., light or dark brown. S., one side rounded, two sides plane with the apex of the seed broader than the base. O., common in waste places. Introduced from Europe.

73. *Datura Stramonium* L. Stramonium, Jimson-weed, Thorn Apple. L., 3.—3.8 mm. W., 1.7—2.2 mm. C., dark brown. S., flattened oval with irregular elevations and pits; one edge nearly straight, the rest curved. O., found quite commonly in waste places; poisonous. Introduced from Asia.

74. *Verbascum Thapsus* L. Common Mullein. L., .5—1. mm. W., .4—.7 mm. C., usually dark brown, sometimes light. S., somewhat cylindrical but of a slightly smaller diameter at the apical end; surface covered with oval grooves or pits. "The pitted surface seems to predominate in *Verbascum Blattaria*

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while the grooved surface seems to be more common in *Verbascum Thapsus.*" Beal. O., very common in meadows and pastures. Introduced from Europe.

75. *Verbascum Blattaria* L. Moth Mullein. (See description of *Verbascum Thapsus.*)

76. *Linaria vulgaris* Hill. Butter and Eggs, Ramsted, Toadflax. L., 1.5—2.1 mm., including wing. W., the same. Thickness about .2—.3 mm. C., dark grayish brown to black. S., flat and circular with a broad wing around the margin; wing marked with very fine radiating lines; surface with numerous rounded elevations. O., a bad weed in grass lands and pastures. Introduced from Europe.

77. *Plantago major* L. Common Plantain, Broad-leaved Plantain. L., 1.—1.8 mm. W., .5—1.2 mm. C., variable shades of yellow, brown and black. S., very variable, oblong, pyramidal, oval or rhomboidal with minute waving markings. O., very common in door yards and found in red clover seeds. Introduced from Europe.

78. *Plantago Rugelii* Dene. Rugel's Plantain. L., 1.5—2.7 mm. W., .6—1. mm. C., dull dark brown to black. S., very variable; flattened variously with rather acute angles and no regular markings, although the surface is finely granular or roughened. O., a bad weed, especially in clover and timothy, also in redtop. Native.

79. *Plantago lanceolata* L. Rib-grass, Ripple Grass, English Plantain, Narrow-leaved Plantain and Buckhorn. L., 2.—2.8 mm. W., .8—1.2 mm. C., shining amber-brown to black. S., allantoid in cross section, tapering at the ends; elongate saucer-shaped with a deep crease running down one side. (See fig. XV.) O., very common in grass seed, alfalfa and red clover. Introduced from Europe.

80. *Dipsacus sylvestris* Huds. Wild Teasel. L., 3.—4.2 mm. W., .8—1.3 mm. C., dark or light grayish brown and finely hairy. S., oblong; nearly square in cross section, with three rounded ridges on each side which unite at the apex; apex slightly hollowed with a tubercle-like projection in the center, base corrugated. O., common in lowlands and pastures. Naturalized from Europe.

81. *Eupatorium purpureum* L. Joe-Pye Weed, Trumpet Weed. L., 2.8—3.3 mm. W., .4—.6 mm. C., dark greenish

brown. S., oblong, four-angled in cross section; contracted at the base to a sharp point; rather thickly dotted with particles of resin-like matter. O., common in lowlands. Native.

82. *Eupatorium perfoliatum* L. Thoroughwort, Boneset. L., 1.8—2.8 mm. W., .2—.5. C., dark grayish brown with irridescent spots. S., oblong, four-angled; contracted at the base into a rather long drawn out point. O., common in waste land. Native.

83. *Erigeron annuus* (L.) Pers. Daisy Fleabane, Sweet Scabious. L., .6—1. mm. W., .1—.4 mm. Color and shape as in the following species but slightly darker and with the hairs less evident. O., quite a bad weed. Introduced from Europe.

84. *Erigeron canadensis* L. Horseweed, Butterweed. L., .8—1.5 mm. W., .2—.6 mm. C., yellowish white. S., flattened; somewhat oval and broader at the apical end; covered with stiff white hairs. O., common in alfalfa and along hedge-rows. Native.

85. *Inula Helenium* L. Elecampane. L., 3.8—4.8 mm. W., .8—1.2 mm. C., light or dark brown. S., linear, four-angled with about twenty to thirty fine longitudinal lines; base of the pappus bristles quite persistent. O., common in rocky pastures and by roads. Introduced from Europe.

86. *Ambrosia trifida* L. Giant or Great Ragweed. L., 9—12 mm. W., 4—8 mm. C., dark brown to black. S., thick spindle-shaped or somewhat turbinate with five to seven very prominent ribs terminating in points slightly above the middle of the seed; beak 2—3 mm. long and quite thick at the base. O., common in low lands. Native.

87. *Ambrosia artemisiifolia* L. Ragweed, Roman Wormwood, Hogweed, Bitterweed. L., 2.4—4.8 mm. W., 1.1—1.5 mm. C., dark mottled brown. S., very thick spindle-shaped with from five to ten lateral ridges terminating in short beaks just above the middle; terminal beak about 1.5 mm. long. O., common in dry meadows and found in alfalfa, red clover and cereals. Native.

88. *Xanthium canadensis* Mill. Cocklebur, Clotbur. L., Fruit about 18 to 25 mm. long. W., about 10 mm. C., rusty brown. S., thick spindle-shaped terminating in two stout beaks

and covered with stout hooked spines; two seeds in each fruit; seeds are brown to black and flattened spindle-shaped. O., common in waste lands. Native.

89. *Xanthium spinosum* L. Cocklebur. Like the preceding species but about one-half the size and with much weaker spines.

90. *Heliopsis helianthoides* L. Sweet Ox-eye. L., 4.—6.4 mm. W., 1.8—2.6 mm. C., brown to straw-colored. S., oblong wedge-shaped usually very prominently four-angled; tapering at the base and abruptly cut off at the apex; with a very low collar or elevation at the apex. O., quite common. Native.

91. *Rudbeckia hirta* L. Black-eyed Susan, Yellow Daisy. L., 1.5—2. mm. W., .3—.5 mm. C., dark brown to black. S., somewhat four-angled; tapering from apical end to the base; apex concave; with twenty to thirty fine longitudinal lines composed of numerous small brick-shaped scales placed side by side. O., quite widely distributed and found chiefly in timothy seed. Native.

92. *Helianthus divaricatus* L. Wild Sunflower. L., 3.8—6.5 mm. W., 1.8—2.2 mm. C., brownish black, sometimes gray. S., obovate and slightly four-angled; pointed at one end. O., common in waste places, thickets, etc., also in alfalfa seeds. Native.

93. *Bidens frondosa* L. Beggar's ticks. L., 5—15 mm. W., 2—4 mm. C., dull brown blotched with black. S., diamond-shaped in cross section; much flattened; with two or sometimes three slightly diverging awns at the apical end. O., common in waste land. Native.

94. *Bidens cernua* L. Sticktight. L., 3.8—6.4 mm. W., 1.4—3. mm. C., dark greenish or grayish brown. S., somewhat wedge-shaped, four sided with a slight groove on each face and four awns at the apical or broader end. O., quite common. Introduced from Europe.

95. *Galinsoga parviflora* Cav. L., 1.2—1.6 mm. W., .5—.7 mm. C., dark gray or brown with numerous silvery hairs. S., somewhat pyramid-shaped with four sides; broadest towards the apex; surface covered with short (.2 mm.) upward pointing hairs and crowned at the apex with a fairly persistent row of white chaffy bristles. O., becoming rapidly abundant about Ithaca, New York; introduced near the Agricultural College about 1907. Native of tropical America.

96. *Achillea Millefolium* L. Yarrow, Milfoil, L., 1.8—2.5 mm. W., .7—1. mm. C., grayish flecked with darker spots. S., flattened obovoid, sometimes curved: apex abruptly contracted and bearing a tubercle; surface with numerous very fine longitudinal striations. O., rather common in grass seeds. Introduced from Europe.

97. *Anthemis Cotula* L. May-weed, Dog Fennel. L., 1.2—2. mm. W., .5—1.5 mm. C., light brown or dark straw-colored. or brown. S., obovoid with about ten ribs composed of tubercle-like projections; base tapering into a cone-shaped structure; with a small tubercle at the apical end. O., very common, especially in timothy, blue-grass and clover seeds. Introduced from Europe.

98. *Anthemis arvensis* L. Corn Chamomile. L., 1.4— 2.5 mm. W., .5—1.5 mm. C., light brown or dark straw-colored. S., somewhat four-angled or rounded in cross section; apex truncate and concave; base with a rounded knob; with about nine rounded ridges on the sides. C., quite common in clover seeds. Introduced from Europe.

99. *Chrysanthemum Leucanthemum* L. Ox-eye or White Daisy, White Weed. L., 1.5—2.4 mm. W., .6—1.1 mm. C., dark background with about ten heavy white ridges giving the whole a light appearance. S., obovate with ten longitudinal ridges slightly broader at apical end. O., frequent but not abundant in clover and small grass seeds. Introduced from Europe.

100. *Tussilago Farfara* L. Colt's Foot. L., 3.2—4 mm. W., .4—.6 mm. C., dark gray, appearing silvery because of the covering of gray hairs. S., narrowly spindle-shaped; more attenuate at the apex than at the base; with about six rows of long hairs pointing towards the apical end; circular in cross section. O., not a bad weed but very common in certain places. Introduced from Europe.

101. *Erechtites hieracifolia* (L.) Raf. Fireweed. L., 2.—3.1 mm. W., .3—.5 mm. C., dark brown with lighter markings. S., spindle-shaped with ten vertical light-colored ridges between which are minute appressed white hairs; expanded slightly at the extreme apex. C., common in certain regions. Native.

102. *Senecio vulgaris* L. Common Groundsel, Rag-wort, Squaw-weed. L., 2.4—3.6 mm. W., .2—.5 mm. C., light straw-colored with vertical rows of white ascending hairs. S., clavate

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and abruptly truncate at the apex; base long attenuate; differs from *Tussilago Farfara* in being smaller and broader towards the apex rather than towards the base. O., quite common in waste places. Introduced from Europe.

103. *Arctium minus* Behr. Burdock. L., 4—6 mm. W., 1.8—2.8 mm. C., dark brown spotted or mottled with black; with fine longitudinal dark lines. S., straight or curved; somewhat oblong; tapering at the base; with a few narrow longitudinal ridges. O., not truly pernicious but common. Introduced from Europe.

104. *Cirsium lanceolatum* L. Hill. Common or Bull Thistle. L., 3.—4.2 mm. W., 1.2—2. mm. C., light straw-colored flecked with blackish markings. S., smooth, slightly flattened, obovate; apex set at an angle to the longitudinal axis, cup-shaped with incurving sides; base rather abruptly contracted. O., common in red clover, alfalfa and grass seeds. Naturalized from Europe.

105. *Cirsium arvense* L. Scop. Canada Thistle. L., 2.2—3.4 mm. W., .8—1.2 mm. C., rich golden brown. S., obovoid and slightly flattened, apex truncate and cup-shaped with incurving edges. O., found in clover seed. Naturalized from Europe.

106. *Centaurea Cyanus* L. Blue Bottle, Bachelor's Button, Corn Flower. L., 3.2—4.8 mm. W., 1.8—2.2 mm. C., shining white or yellowish gray, sometimes bluish white. S., flattened cylindrical except that the base is obliquely truneate; apex abruptly and squarely truncate with a tubercle in the middle; pappus bristles quite persistent. O., common in coarse clover and grass seeds. Appeared in Ithaca, New York, in 1885 and is growing more and more abundant each year. Introduced from Europe.

107. *Cichorium Intybus* L. Common Chicory, Blue Sailors. L., 2.5—3.5 mm. W., .8—1.2 mm. C., light yellowish brown, slightly mottled with black. S., irregularly truncate; four or five-angled with two to four faint longitudinal lines on each side; surmounted by a double row of scales or bristles. O., found in clover, alfalfa and grass. Introduced from Europe.

108. *Tragopogon porrifolius* L. Salsify. L., 10—18 mm. without pappus and 70-80 mm. with pappus. W., 1.8—2.3 mm. C., brownish gray flecked with small whitish scales. S., nearly cylindrical but quite spindle-shaped; tapering and curving at the

apex; ten ribbed, the ribs being composed of diverging scales; beak slender and from twenty to thirty mm. long. O., fairly common. Introduced from Europe.

109. *Tragopogon pratensis* L. L., 10—15 mm. without pappus; 12—25 with pappus. W., 1.4—2 mm. Color and shape, almost identical with *Tragopogon porrifolius*. O., common in rocky fields. Introduced from Europe.

110. *Taraxacum officinale* Weber. Common Dandelion. L., 3.—4.5 mm. without the style. W., .8—1.2 mm. C., straw-colored or dark reddish brown. S., oblanceolate with twelve to fourteen longitudinal ridges composed of barblike projections pointed toward the apical end, near which they are clustered; beak in two parts, one short and thick and the other two or three times the length of the achene. O., very common especially in grass seeds. Naturalized from Europe.

111. *Sonchus oleraceus* L. Common Sow Thistle. L., 2.8—3.1 mm. W., 1.—1.2 mm. C., straw-colored to reddish brown. S., flattened oval with nine to fourteen fine longitudinal ridges; both ends rather abruptly terminated; with transverse wrinkles. O., rather common in many farm seeds. Introduced from Europe.

112. *Sonchus asper* (L.) Hill. Spiny-leaved Sow Thistle. L., 2.2—3.2 mm. W., .8—1.2 mm. C., dull reddish brown. S., flattened oval sometimes with a slight wing; sometimes spindle-shaped; with three to five longitudinal ridges on each face. O., rather common. Introduced from Europe.

113. *Lactuca scariola* L. Prickly Lettuce. L., 3.—3.8 mm. W., .7—1 mm. C., dull brown and slightly mottled. S., spindle-shaped, slightly broader towards the apical end, with five to seven vertical ridges. O., spreading rapidly and becoming quite common. Introduced from Europe.

114. *Lactuca canadensis* L. Wild Lettuce or Horseweed. L., 3.3—4.8 mm. without the style. W., 1.5—2.2 mm. C., dusty black. S., flattened oval with three prominent ridges on each face; has the appearance of a winged seed; beak quite persistent. O., very common, and often troublesome. Native.

115. *Lactuca spicata* (Lam.) Hitchc. L., 3.5—5.2 mm. W., 1.—2.2 mm. C., dark brown. S., flat and irregularly oval with from ten to sixteen ridges. O., not particularly common. Native.

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116. *Prenanthes alba* L. White Lettuce, Rattlesnake-root. L., 4.—6.2 mm. W., .8—1.4 mm. C., rich dark brown. S., linear oblong, contracted at the base but not at the apex; somewhat four-angled with seventeen to twenty long striations; pappus rusty brown. O., quite common. Native.

117. *Hieracium aurantiacum* L. Orange Hawkweed, Devil's Paint-brush. L., 1.8—2.4 mm. W., about .3 mm. C., dead black. S., fluted cylindrical with ten longitudinal ridges which dilate slightly at the apical end; with very fine hairs about 15 to 20 mm. arranged on the ridges and pointing towards the apical end. O., very common in grass seed. Naturalized from Europe.

118. *Hieracium scabrum.* Michx. L., 2.—2.8 mm. W., .2—.4 mm. Color, dead black. S., fluted cylindrical, expanded at the extreme apex and more attenuate at the base than *Hieracium aurantiacum;* hairs on the ridges also slightly more numerous. O., fairly common in pastures. Native.

KEY TO PLATE IX.

Seven-tenths size of original.

I. **Sonchus oleraceus L.**
II. **Cichorium Intybus L.**
III. **Lactuca spicata (Lam.) Hitchc.**
IV. **Arctium minus Bernh.**
V. **Hieracium scabrum Michx.**
VI. **Lactuca canadensis L.**
VII. **Chenopodium hybridum L.**
VIII. **Cirsium arvense (L.) Scop.**
IX. **Galinsoga parviflora Cav.**
X. **Lithospermum arvense L.**
XI. **Verbena hastata L.**
XII. **Oenothera biennis L.**

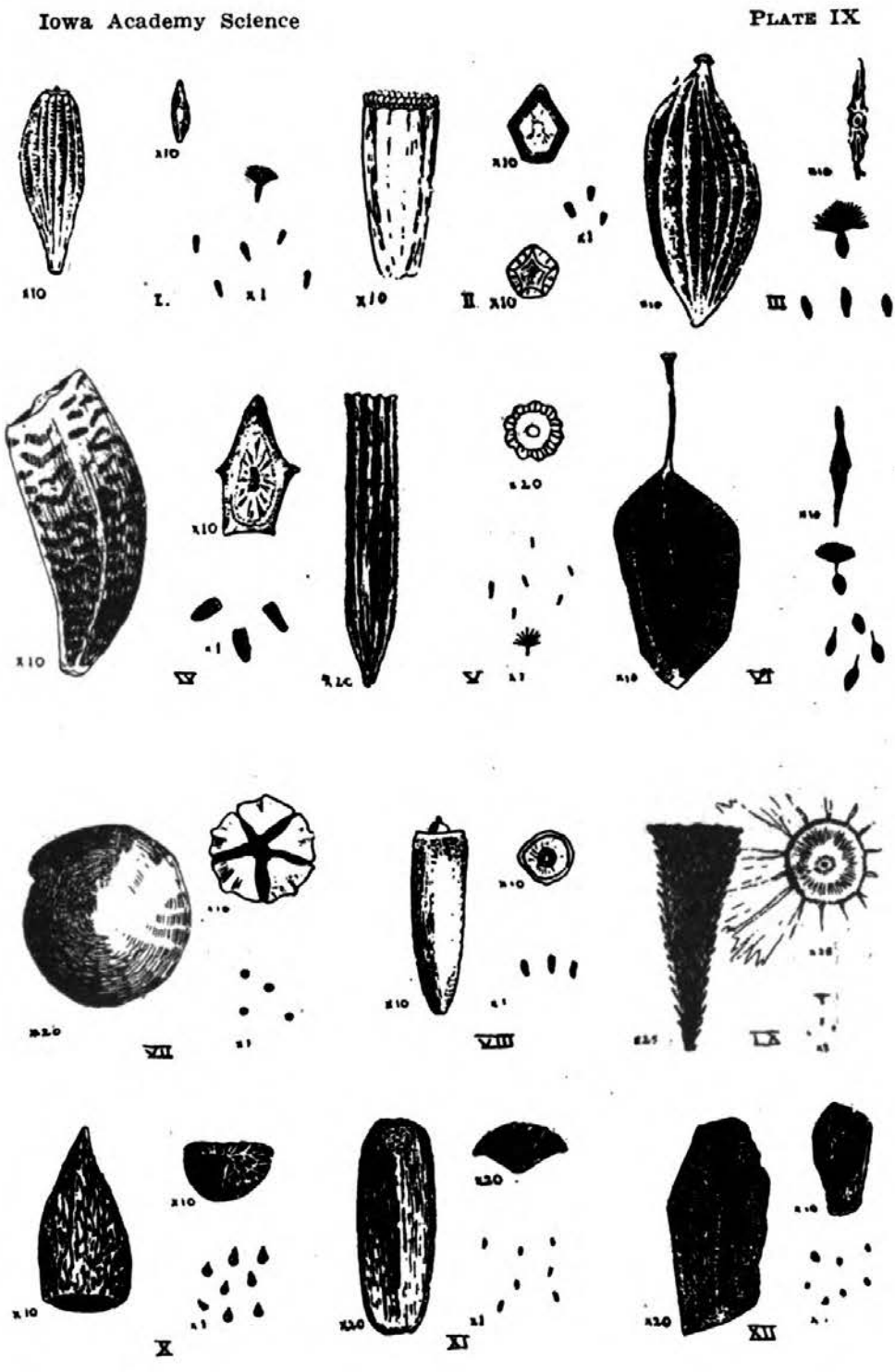
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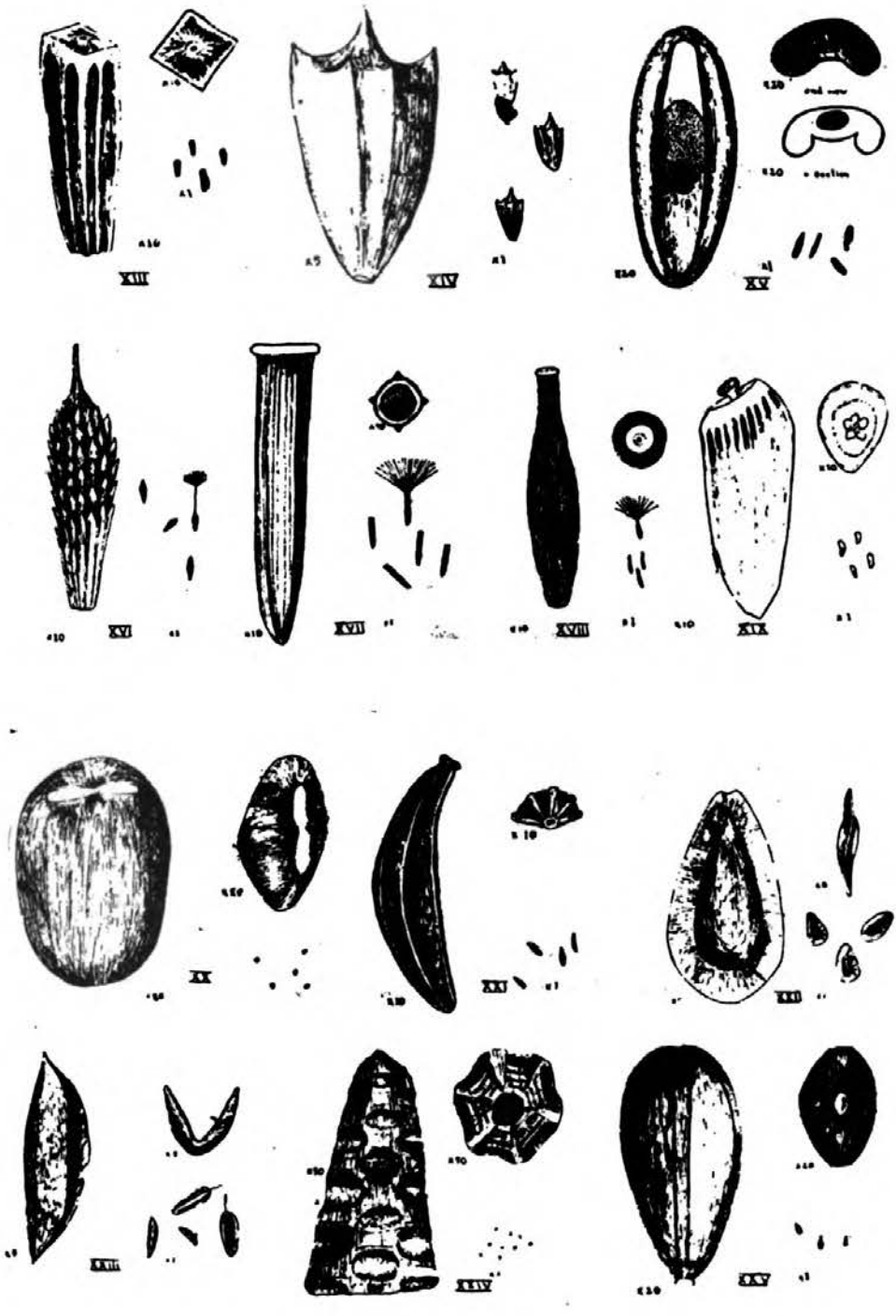
PLATE IX
I.
II.
III
IV
V
VI
VII
VIII
IX
X
XI
XII

KEY TO PLATE X.

Seven-tenths size of original.

XIII. Dipsacus sylvestris Huds.
XIV. Ambrosia trifida L.
XV. Plantago lanceolata L.
XVI. Taraxacum officinale Weber.
XVII. Prenanthes alba L.
XVIII. Tussilago Farfara L.
XIX. Cirsium lanceolatum (L.) Hill.
XX. Nepeta Cataria L.
XXI. Carum Carvi L.
XXII. Asclepias Syriaca L.
XXIII. Bromus secalinus L.
XXIV. Verbascum Thapsus L.
XXV. Prunella vulgaris L.



KEY TO PLATE XI.

Seven-tenths size of original.

XXVI. Anthemis arvensis L.
XXVII. Anthemis Cotula L.
XXVIII. Chrysanthemum Leucanthemum L.
XXIX. Bidens frondosa L.
XXX. Daucus Carota L.
XXXI. Centaurea Cyanus L.
XXXII. Medicago sativa L.
XXXIII. Medicago lupulina L.
XXXIV. Stellaria media (L.) Cyrill.
XXXV. Polygonum Convolvulus L.
XXXVI. Rumex crispus L.
XXXVII. Setaria glauca (L.) Beauv.
XXXVIII. Abutilon Theophrasti Medic.
XXXIX. Barbarea vulgaris R. Br.
XL. Capsella Bursa-pastoris (L.) Medic.
XLI. Amaranthus retroflexus L.

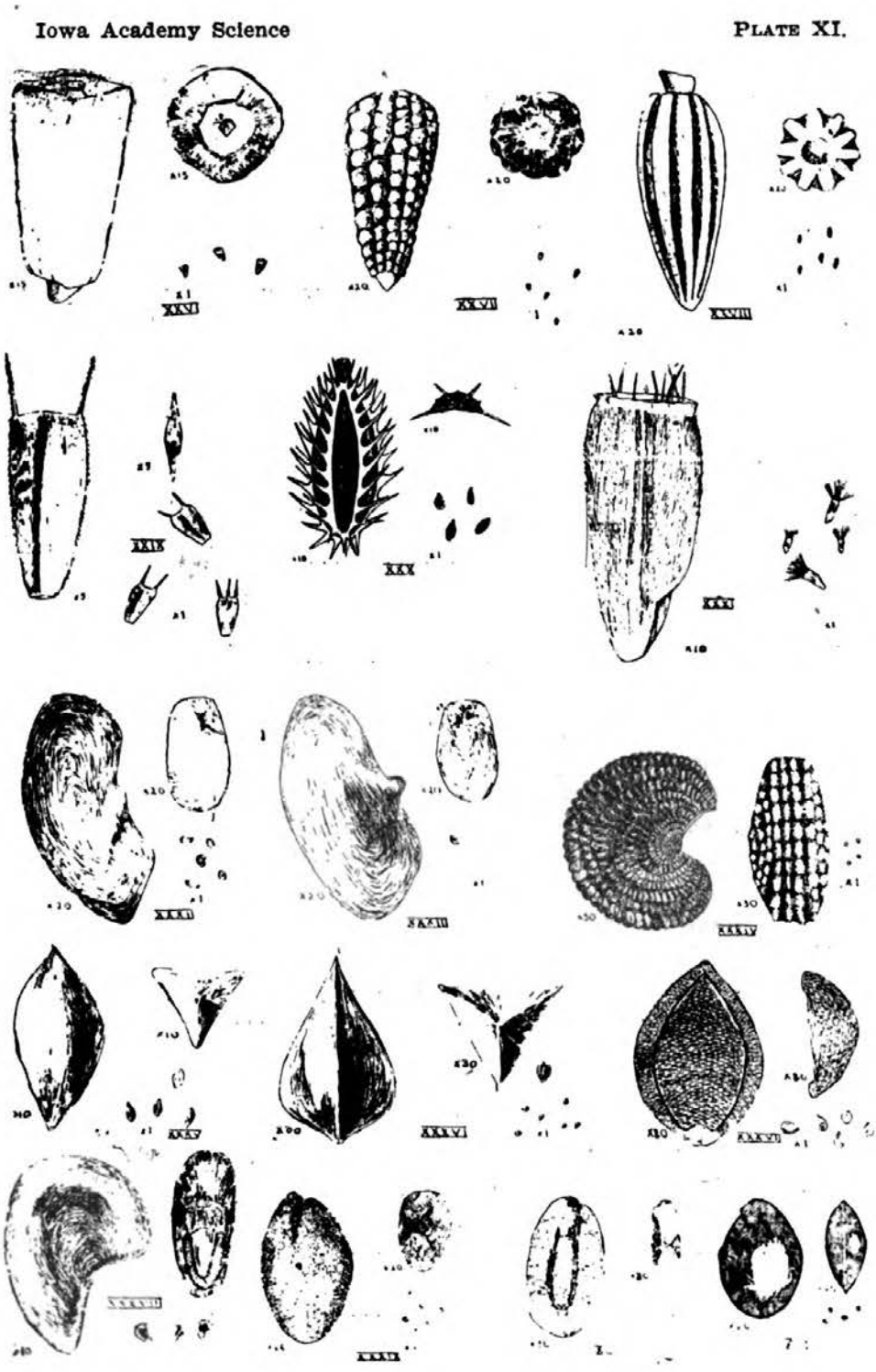

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PLATE XI.

KEY TO SEEDS.

I. 10 to 20 mm. long.
1. With more than 1 appendage (figs. XXIX and XIV).
2. Covered with hooked spines.
3. 18 to 25 mm. long.....*Xanthium canadensis* Hill 88
3. 10 to 13 mm. long.....*Xanthium spinosum* L. 89
2. With appendages at apical end.
3. With 2 to 4 nearly equal appendages (fig. XXIX).....
.....*Bidens frondosa* L. 93
3. With more than four unequal appendages or spines at apical end (fig. XIV) .....*Ambrosia trifida* L. 86
1. Without more than 1 long appendage.
2. 10 to 18 mm. long without pappus. Beak 1 to 10 mm. long
.....*Tragopogon porrifolius* L. 108
2. Beak short, about 4 mm. long..... *Tragopogon pratensis* L. 109

I. 9 to 10 mm. long.
II. At least twice as long as broad.
1. With 2 or 3 long equal terminal appendages (fig. XXIX)
.....*Bidens frondosa* L. 93
II. Not twice as long as broad.
1. With numerous (4 to 8) unequal terminal straight appendages (fig. XIV).....*Ambrosia trifida* L. 86
1. With numerous (more than 8) terminal hooked prickles
.....*Agrimonia striata* Michx. 45

I. 8 to 9 mm. long.
II. At least twice as long as broad.
1. With 2 or 3 terminal appendages (fig. XXIX).....
.....*Bidens frondosa* L. 93
II. Not twice as long as broad.
1. With numerous terminal appendages.
2. With 4 to 8 straight appendages (fig. XIV).....
.....*Ambrosia trifida* L. 86
2. With more than 8 hooked appendages.....
.....*Agrimonia striata* Michx. 45
1. Without numerous appendages but with a wing.....
.....*Asclepias syriaca* L. 62

I. 7 to 8 mm. long.
II. At least twice as long as broad.
1. With 2 to 4 long terminal appendages, flattish (fig. XXIX)
.....*Bidens frondosa* L. 93
1. Without terminal appendages, deeply grooved up one side (fig. XXIII).....*Bromus secalinus* L. 11
II. Not twice as long as broad.
1. Triangular in cross section, shining black (figs. XXXV and XXXVI).....*Polygonum scandens* Michx. 20

1. Not triangular in cross section or shining black.
2. With numerous hooked terminal appendages..... ..... *Agrimonia striata* Michx. 45
2. Without terminal appendages but with a wing (fig. XXII) ..... *Asclepias syriaca* L. 62

I. 6 to 7 mm. long.

II. Spindle shaped with a deep groove up one side, twice as long as broad (fig. XXIII)..... *Bromus secalinus* L. 11

II. Not spindle shaped or with but one deep longitudinal groove.

1. Triangular in cross section, shining black..... ..... *Polygonum scandens* Michx. 20

1. Not triangular in cross section.

2. With terminal spines or prickles.

3. With not more than 4 awns or prickles.

4. With 4 awns, 4 angles, faces slightly concave..... ..... *Bidens cernua* L. 94

4. With not more than 3 awns, usually 2, faces strongly 1-nerved (fig. XXIX)..... *Bidens frondosa* L.

3. With more than 4 terminal prickles usually hooked ..... *Agrimonia striata* Michx. 45

2. Without terminal spines or prickles.

3. Seeds winged (fig. XXII)..... *Asclepias syriaca* L. 62

3. Seeds not winged.

4. Uniform rusty brown, not over 1.4 mm. wide (fig. XVII)..... *Prenanthes alba* L. 116

4. Not uniform, rusty red.

5. Quite pronouncedly 4-faced, angles nearly equal.. ..... *Heliopsis helianthoides* L. Sweet 90

5. Not pronouncedly 4-faced or equally angled, usually mottled in color.

6. Usually with 1 or more longitudinal striations quite angular (fig. IV).... *Arctium minus* Berh. 103

6. Without longitudinal striations, not angular.... ..... *Helianthus divaricatus* L. 92

I. 5 to 6 mm. long.

II. At least twice as long as broad.

1. With long terminal awns.

2. With not more than 3, usually 2 straight awns (fig. XXIX)..... *Bidens frondosa* L. 93

2. With 4 awns, 4-angled..... *Bidens cernua* L. 94

1. Without long terminal awns.

2. Less than 1 mm. thick, curved with from 10 to 16 longitudinal ridges, dark (fig. III)..... ..... *Lactuca spicata* (Lam.) Hitchc. 115

2. More than 1 mm. thick.

3. Uniformly rusty red or gold-brown, less than 1.5 mm. broad, without a deep groove (fig. XVII)..... ..... *Prenanthes alba* L. 116

3. Not uniformly rusty red or golden brown, more than 1.5 mm. broad.
4. With a deep groove up one side...*Bromus secalinus* L. 11
4. Without a deep groove up one side.
5. Quite pronouncedly 4-faced and uniformly colored .....*Heliopsis helianthoides* L. Sweet. 90
5. Not pronouncedly 4-faced, usually mottled in color.
6. Usually with 1 or more longitudinal striations, quite angular (fig. IV)...*Arctium minus* Berh. 103
6. Without longitudinal striations, not angular.... .....*Helianthus divaricatus* L. 92

II. Not twice as long as broad.
1. Triangular in cross section, shining black..... .....*Polygonum scandens* Michx. 20
1. Not triangular in cross section.
2. With hooked terminal prickles (Bur)..... .....*Agrimonia striata* Michx. 45
2. Without hooked terminal appendages.
3. Almost globular white fruit.....*Rhus Toxicodendron* L. 53
3. Not globular or white.
4. Short kidney-shaped, flattened, brown, mottled with purple.....*Amphicarpa monoica* (L.) Ell. 52
4. Somewhat fusiform, reddish with 4 or 5 distinct longitudinal ridges.....*Impatiens biflora* Walt. 54

I. 4 to 5 mm. long.

II. At least twice as long as broad.
1. Surface shining.
2. Rich chestnut brown, oval.....*Polygonum virginianum* L. 18
2. Grayish white, obliquely truncate at base (fig. XXXI)... .....*Centaurea Cyanus* L. 106
1. Surface not shining.
2. With numerous longitudinal notched ridges.
3. Fruit broadest in middle, concavo-convex or plano-convex, oval ridges pronounced and notched entire length (fig. XXXV).....*Daucus Carota* L. 61
3. Fruit narrow, broadest toward apical end, oblanceolate, with 12-14 longitudinal ridges pronouncedly notched near apical end (fig. XVI) *Taraxacum officinale* Weber 110
2. Without numerous longitudinal notched ridges.
3. Surface smooth, not pronouncedly ridged.
4. Seeds very light-colored, some faintly blotched with dark (fig. XIX).....*Cirsium lanceolatum* L. Hill. 104
4. Seeds dark, usually mottled.
5. Quite angular, mottled in transverse lines (fig. IV) .....*Arctium minus* Berh. 103
5. Not angular, mottled longitudinally..... .....*Helianthus divaricatus* L. 92

3. Surface with longitudinal striations.
4. Fruit very thin but not narrow.
5. Broader towards apex, winged, black with usually but one longitudinal ridge on each face (fig. VI) .....*Lactuca canadensis* L. 114
5. Broadest toward base or near center, brown, with two or more longitudinal ridges (fig. III)..... .....*Lactuca spicata* Lam. Hitchc. 115
4. Fruit not thin, nearly as thick as broad.
5. More than 1.5 mm. broad.
6. Quite pronouncedly 4-faced and uniform in color .....*Heliopsis helianthoides* L. Sweet. 90
6. Not pronouncedly 4-faced and usually mottled in color.
7. Usually with 1 or more longitudinal striations, angular and mottled transversely (fig. IV) .....*Arctium minus* Berh. 103
7. Usually without longitudinal striations, not angular and if mottled, mottled longitudinally .....*Helianthus divaricatus* L. 92
5. Less than 1.5 mm. broad.
6. Quite pronouncedly curved, tapering at both ends with about 6 light longitudinal striations (fig. XXI) .....*Carum Carvi* L. 60
6. Not pronouncedly curved or tapering at each end.
7. With two deep grooves or three ridges on a side, comparatively short, quite 4-sided (fig. XIII).....*Dipsacus sylvestris* Ruds. 80
7. Without deep grooves or with more than 3 ridges on a side.
8. Distinctly *reddish* brown, with 17-20 fine longitudinal striations (fig. XVII)..... .....*Prenanthes alba* L. 116
8. Not *reddish* brown, with 20-30 fine longitudinal striations.....*Inula Helenium* L. 85

II. Not twice as long as broad.
1. Triangular in cross section, shining black..... .....*Polygonum scandens* Michx. 20
1. Not triangular in cross section.
2. With numerous terminal appendages or spines..... .....*Ambrosia artemisiifolia* L. 86
2. Without numerous terminal appendages.
3. Surface shining.
4. Rich chestnut brown, oval..*Polygonum virginianum* L. 18
4. Grayish white, obliquely truncate at base (fig. XXXI) .....*Centaurea Cyanus* L. 106
3. Surface not shining.
4. Fruit globular, white.....*Rhus Toxicodendron* L. 53
4. Fruit not globular nor white.

5. Very thin, black, winged, with 1-2 fine longitudinal striations, broadest toward apex (fig. VI)..... .....*Lactuca canadensis* L. 114

5. Thicker, not winged.

6. Plano-convex or concavo-convex, broadest at middle, tapering at both ends almost equally (fig. XXX).....*Daucus Carota* L. 61

6. Not tapering equally at both ends.

7. One side covered with prickles not arranged in lines, irregular in shape..... .....*Lappula virginiana* (L.) Greene 66

Without spines.

8. With 4 to 5 longitudinal striations, tapering more acutely at apex, red..... .....*Impatiens biflora* Walt. 54

8. Without longitudinal striations, not red.

9. Plump, light brown with purplish blotches, no prominent notch at hilum..... .....*Amphicarpa monoica* (L.) Ell. 52

9. Slightly concave on each side with a pronounced notch at hilum, short kidney-shaped (fig. XXXVIII)..... .....*Abutilon Theophrasti* Medic. 55

I. 3 to 4 mm. long.

II. At least twice as long as broad.

1. With more than one persistent terminal appendage.

2. 1 to 4 awns at apex.

3. Awns ½ length of achene.....*Bidens cernua* L. 94

3. Awn less than ½ length of achene.....*Bidens connata* L.

2. With more than 4 terminal appendages.

3. With a double row of chaffy scales at apex (fig. II) .....*Cichorium Intybus* L. 107

3. With a pappus of capillary hairs at apex.

4. Seed light straw-colored and obliquely truncate at base, thick set (fig. XXXI)...*Centaurea Cyanus* L. 106

5. Dark brown, very slender and somewhat square in cross section.....*Inula Helenium* L. 85

3. Terminal appendages short and stiff.

4. Top-shaped with spines arranged in a ring around the top and with one in the center..... ..... *Ambrosia artemisiifolia* L. 87

4. Somewhat spindle-shaped with 12-14 longitudinal ridges notched in short spines near apex (fig. XVI) .....*Taraxacum officinale* Weber 110

1. Without more than 1 persistent terminal appendage.

2. Surface shining, rich chestnut brown..... .....*Polygonum virginianum* L. 18

2. Surface not shining.
3. Surface smooth, not hairy or with longitudinal lines.
4. More than 1.2 mm. wide, not reddish or tan.
5. Light straw-colored (fig. XIX)..... .....*Cirsium lanceolatum* L. Hill. 104
5. Dark-colored.....*Helianthus divaricatus* L. 92
4. Less than 1.2 mm. wide, reddish (fig. VIII)..... .....*Cirsium arvense* L. Scop. 105
3. Surface ridged or hairy, not smooth.
4. Less than 1 mm. broad.
5. Pronouncedly flattened.
6. Very sharp attenuate at apex, dull brown..... .....*Lactuca scariola* L. 113
6. Not sharply attenuate at apex.
7. Distinctly reddish with fine longitudinal ridges .....*Sonchus oleraceus* L. 111
7. Brown, with comparatively heavy longitudinal ridges (fig. XXX).....*Daucus Carota* L. 61
5. Not pronouncedly flattened.
6. Square in cross section.
7. Sharply pointed at base, very slender..... .....*Eupatorium purpureum* L. 81
7. Not sharply pointed at base or slender..... .....*Dipsacus sylvestris* Huds. 80
6. Not square in cross section.
7. Very prominently 6- or 7-ridged, curved, usually greenish, plano- or concavo-convex (fig. XXX) .....*Daucus Carota* L. 61
7. Not prominently 6- or 7-ridged or curved.
8. Light brown, broadest toward apex..... .....*Senecio vulgaris* L. 102
8. Dark brown, broadest toward middle..... .....*Erechtites hieracifolia* (L.) Raf. 101
8. Silvery or dark gray, broadest toward base (fig. XVIII).....*Tussilago Farfara* L. 100
4. More than 1 mm. broad.
5. Surface not pronouncedly ridged.
6. Very light colored, some faintly marked with dark (fig. XIX)....*Cirsium lanceolatum* L. Hill 104
6. Not light colored.
7. Quite angular, mottled in transverse lines (fig. IX).....*Arctium minus* Berh. 103
7. Not angular, mottled longitudinally..... .....*Helianthus divaricatus* L. 92
5. Surface conspicuously ridged.
6. Distinctly flattened.
7. Black, winged with 1 to 2 ridges on each face (fig. VII).....*Lactuca canadensis* L. 114

7. Dark brown with 10-16 ridges irregularly oval (fig. III).....*Lactuca spicata* (Lam.) Hitchc. 115
6. Not distinctly flattened.
7. Plano-convex or concavo-convex, ridges spiny, wide (fig. XXX).....*Daucus Carota* L. 61
7. Square in cross section with 2 grooves on each face (fig. XIII).....*Dipsacus sylvestris* Huds. 80
7. Not square in cross section, very prominently 6- or 7-ridged, ridges not spiny, reddish (fig. XXI).....*Carum Carvi* L. 60

II. Not twice as long as broad.
1. Triangular in cross section.
2. Black.
3. Shining black, over 3.5 mm.....*Polygonum scandens* L. 20
3. Dull black, less than 3.5 mm. (fig. XXXV).....
.....*Polygonum Convolvulus* L. 19
2. Not black.
3. Prominently transversely ridged with black or darker lines.....*Setaria glauca* (L.) Beauv. 4
3. Surface not transversely striate, shining.....
.....*Echinochloa Crus-galli* L. Beauv. 3
1. Not triangular in cross section.
2. Black or nearly so.
3. Round and markedly shining...*Polygonum Persicaria* L. 17
3. Not round and not markedly shining.
4. Thin and wafer-like, usually winged.
5. Nearly circular without longitudinal striations....
.....*Laportea canadensis* (L.) Gaud. 12
5. Oval with 1 to 2 longitudinal striations on each face (fig. VI).....*Lactuca canadensis* L. 114.
4. Not thin or wafer-like or winged.
5. One side covered with stiff prickles.....
.....*Lappula virginiana* (L.) 66
5. Not as above.
6. Acuminate at one end, not pronouncedly ridged
.....*Helianthus divaricatus* L. 92
6. Not acuminate at one end.
7. Surface covered with gray hairs.....
.....*Malva moschata* L. 57
7. Surface not covered with hairs.
8. Nearly as thick as wide, surface with about 30 rows of short rounded projections, angular.....*Agrostemma Githago* L. 31
8. Not nearly as thick as wide, surface with shallow pits somewhat kidney-shaped.....
.....*Datura Stramonium* L. 73
2. Not black or nearly so.
3. Shining chestnut brown.....*Polygonum virginianum* L. 18
3. Not shining chestnut brown.

4. Fruit white and almost globular.....
.....*Rhus Toxicodendron* L. 53

4. Not white or globular.

5. Wafer-like usually with 2 short projections on the margin, often with a narrow wing.

6. Style bent towards hilum, usually quite dark....
.....*Laportea canadensis* (L.) Gaud. 12

6. Style straight or bent away from hilum.....
.....*Ranunculus acris* L. 37

5. Not wafer-like.

6. Shining whitish, noticeably obliquely truncate at base, pappus quite persistent (fig. XXXI).....
.....*Centaurea Cyanus* L. 106

6. Not shining white.

7. With longitudinal striations noticeable to eye.

8. With numerous terminal appendages, top-shaped .....*Ambrosia artemisiifolia* L. 87

8. Without numerous terminal appendages.

9. Plano-convex or concavo-convex, striations prominent and often spiny, greenish brown (fig. XXX).....*Daucus Carota* L. 61

9. Not as above.

10. Light colored.

11. Plano-convex tapering almost equally at each end.....
.....*Echinochloa Crus-galli* L. Beauv. 3

11. Tapering unequally at the ends, not plano-convex.

12. Surface pitted, short and thick, hilum dark, apex long alternate, hard (fig. X).....
.....*Lithospermum arvense* L. 67

12. Surface not pitted, not short and thick, apex not long alternate (fig. XIX).*Cirsium lanceolatum* L. Hill 104

10. Dark colored.

11. With four or five *marked* striations, not mottled, oval, reddish.....
.....*Impatiens biflora* Walt. 54

11. Usually mottled without *marked* striations.

12. Angular and mottled in transverse lines (fig. IV)..*Arctium minus* L. 103

12. Not angular and if mottled, mottled longitudinally .....
.....*Helianthus divaricatus* L. 92

7. Without noticeable longitudinal striations.

8. Plano-convex, not turbinate or kidney-shaped.

9. With fine *transverse* striations.....
.....*Setaria glauca* L. Beauv. 4
9. Surface shining without transverse striations.....*Echinochloa Crus-galli* L. Beauv. 3
8. Not plano-convex.
9. Somewhat turbinate, not at all kidney-shaped, hilum dark, surface light spotted with dark (fig. X).....
.....*Lithospermum arvense* L. 67
9. Not at all turbinate, somewhat kidney-shaped.
10. Surface shallow-pitted, dark.....
.....*Datura Stramonium* L. 73
10. Surface smooth, not pitted.
11. Usually over 3.2 mm. long, notch at hilum very deep (fig. XXXVIII)....
.....*Abutilon Theophrasti* Medic. 55
11. Usually under 3.2 mm. long, notch at hilum not very deep.....
.....*Malva moschata* L. 57

I. 2 to 3 mm. long.
II. At least twice as long as broad.
1. Appearing white or nearly so, streaked with dark gray.
2. Flattened .....*Achillea millefolium* L. 96
2. Not flattened (fig. XXVIII).....
.....*Chrysanthemum Leucanthemum* L. 99
1. Not white or gray.
2. Black or nearly so.
3. Boat-shaped or allantoid in cross section, shining (fig. XV).....*Plantago lanceolata* L. 79
3. Not boat-shaped or allantoid in cross section.
4. More than .6 mm. broad.
5. Shaped like a quarter of a cylinder, very regularly angled, crowned with short gray hairs.....
.....*Leonurus Cardiaca* L. 72
5. Irregularly angled, surface not reticulated, angles distinct.....*Plantago Rugelii* Dcne. 78
5. Broad spindle-shaped, blunt at base, flattened on one side.....*Digitaria sanguinalis* (L.) Scop. 1
4. Less than .6 mm. broad.
5. Base drawn out into a long acute point, not jet black.
6. Over 2.8 mm. long, dark green-brown.....
.....*Eupatorium purpureum* L. 81
6. Less than 2.8 mm. long, dark gray-brown.....
.....*Eupatorium perfoliatum* L. 82
5. Base not drawn out into acute base, jet black.
6. Nearly square in cross section, 20 to 30 longitudinal lines.....*Rudbeckia hirta* L. 91

6. Not nearly square in cross section with 10 longitudinal ridges.....*Hieracium* sp. 117-118

2. Not black or nearly so.
3. With numerous short terminal appendages and one long beak, turbinate.....*Ambrosia artemisiifolia* L. 86
3. With a double row of short persistent scales at terminal end (fig. II).....*Cichorium Intybus* L. 107
3. Without numerous terminal appendages.
4. Surface markedly shining.
5. Very dark brown, oval, a small whitish appendage near hilum, tapering at both ends (fig. XXV) .....*Prunella vulgaris* L. 71
5. Light brown or tan, not tapering at both ends, a cuplike collar at apex (fig. VIII)..... .....*Cirsium arvense* L. Scop. 105
4. Surface not markedly shining.
5. Surface covered with about 10 longitudinal rows of tubercle-like projections (fig. XXVII)..... .....*Anthemis Cotula* L. 97
5. Longitudinal lines if present not composed of tubercle-like projections.
6. Thin and wafer-like, flattened.
7. With a narrow wing, 3 to 5 regular ridges and broadest near middle..... .....*Sonchus asper* L. Hill. 112
7. Without a wing, broadest toward apex..... .....*Sonchus oleraceus* L. 111
6. Not thin and wafer-like.
7. Plano-convex or concavo-convex.
8. Broad, with longitudinal rows on the surface usually composed of short bristles, not reddish.....*Daucus Carota* L. 69
8. Narrow, without many longitudinal rows of bristles.....*Digitaria sanguinalis* (L.) Scop. 1
7. Not plano-convex or concavo-convex.
8. Comparatively short and distinctly triangular in cross section.
9. Equally 3-sided, angles not rounded..... .....*Rumex obtusifolius* L. 14
9. Unequally 3-sided, angles slightly rounded .....*Polygonum aviculare* L. 16
8. Not distinctly triangular in cross section.
9. Light straw-colored, broad at apex, contracted at base, with about 9 longitudinal grooves (fig. XXVI)..... .....*Anthemis arvensis* L. 97
9. Not light straw-colored or noticeably broader at the apex.

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10. .5 mm. or less broad.
11. Light brown, broadest toward the apex.....*Senecio vulgaris* L. 102
11. Dark brown, broadest toward the middle..*Erechtites hieracifolia* (L.) Raf. 101
10. Over .5 mm. broad.
11. With pronounced lateral ridges.
12. With more than 5 prominent ridges, not square in cross section, dark surface with lighter ridges (fig. XXI).....*Carum Carvi* L. 61
12. With less than 5 prominent ridges, somewhat square in cross section, one face noticeably lighter and a light scar at hilum (fig. XI)..... .....*Verbena hastata* L. 69
11. Without prominent lateral ridges... .....*Cirsium arvense* (L.) Scop. 105

II. Not twice as long as broad.
1. Noticeably triangular or semi-circular in cross section.
2. Semi-circular in cross section.
3. Surface smooth.....*Echinochloa Crus-galli* (L.) Beauv. 3
3. Surface not smooth.
4. With lateral striations, usually over 2.5 mm. long (fig. XXXVII).....*Setaria glauca* (L.) Beauv. 4
4. With lateral and longitudinal striations, usually 2.5 mm. long .....*Setaria viridis* (L.) Beauv. 5
2. Not semi-circular in cross section but noticeably triangular.
3. Dull black, over 2.5 mm. long..*Polygonum Convolvulus* L. 19
3. Brown or tan, usually under 2.5 mm. long.
4. Shining, abruptly attenuate at end, angles acute.
5. Sides and angles concave and dipping just back of apex (fig. XXXVI).....*Rumex crispus* L. 13
5. Sides and angles straight, apex more acuminate.. .....*Rumex obtusifolius* L. 14
4. Not shining, angles somewhat rounded, unequally 3-sided .....*Polygonum aviculare* L. 16

1. Not noticeably triangular in cross section.
2. Thin and wafer-like.
3. White or light gray, obovoid....*Achillea millefolium* L. 96
3. Not white or light gray.
4. Black or blackish.
5. Shining, almost round.....*Polygonum Persicaria* L. 17
5. Not shining.
6. With a broad wing all around periphery..... .....*Linaria vulgaris* Hill. 76

6. With a narrow wing and two projections, the style bent towards hilum..... .....*Laportea canadensis* L. Gaud. 12
4. Not black or blackish.
5. Margin rounded.....*Polygonum Persicaria* L. 17
5. Margin acute.....*Ranunculus acris* L. 37
2. Not thin and wafer-like.
3. Surface shining.
4. Flattened.
5. Round.....*Chenopodium hybridum* L. 21
5. Not round.
6. Black, broadly spindle formed..... .....*Polygonum Persicaria* L. 17
6. Not black, shield shaped....*Trifolium pratense* L. 46
4. Not flattened.
5. With a small white appendage at base (fig. XXV) .....*Prunella vulgaris* L. 71
5. Dark disk at base, turbinate..*Lithospermum arvense* 67
3. Surface not shining.
4. Diameter from end to end nearly uniform, somewhat 4-angled.
5. Dark brown and comparatively thick..... .....*Verbena urticaefolium* L. 68
5. Light brown and comparatively slender..... .....*Verbena hastata* L. 69
4. Diameter not uniform from end to end.
5. Black or nearly so.
6. Covered with bristling gray hairs (fruit)..... .....*Malva moschata* L. 57
6. Not covered with gray hairs.
7. More than 2.5 mm. long..*Agrostemma Githago* L. 31
7. Less than 2.5 mm. long..... .....*Saponaria officinalis* L. 34
5. Not black or nearly so.
6. Pointed at least at one end.
7. Plano-convex or concavo-convex with longitudinal striations, oval (fig. XXX)..... .....*Daucus Carota* L. 61
7. Not plano-convex or concavo-convex.
8. Distinctly red-brown.
9. Coat closely fitting, irregularly or regularly triangular in cross section, reddish brown (fig. XXX).....*Daucus Carota* L. 61
9. Coat loosely fitting, angles slightly winged .....*Oenothera biennis* L. 59
8. Not red-brown.
9. Broadest at apex, light straw-colored with about 9 longitudinal lines (fig. XXVI).. .....*Anthemis arvensis* L. 98

9. Broadest toward base, turbinate, base very dark (fig. X)....*Lithospermum arvense* L. 67
6. Not pointed at either end.
7. With longitudinal striations or sharp angles.
8. Dark brick-red.....*Oenothera biennis* L. 59
8. Not dark brick-red.
9. Plano-convex or concavo-convex, greenish brown (fig. XXX).....*Daucus Carota* L. 61
9. Not plano-convex or concavo-convex, light straw-colored, blunt at the ends (fig. XXVI).....*Anthemis arvensis* L. 98
7. Without longitudinal striations.
8. Flattened or concave on two sides.
9. Covered with short hairs (fruit).....
.....*Malva moschata* L. 57
9. Not covered with short hairs.
10. With a narrow wing, almost round, thin at edges.....*Ranunculus abortivus* L. 36
10. Without a narrow wing, thick at one edge, thinner at the other.
11. No angles, edges rounded, faces concave with outer coat on.....
.....*Malva moschata* L. 57
11. Faces plane with outer coat on, darker than next preceding..*Malva rotundifolia* L. 56
8. Not flattened or concave, faces slightly convex.
9. With a short distinct elevation near scar reaching beyond the normal outline of the seed (fig. XXXIII)...*Medicago lupulina* L. 51
9. Without a short distinct elevation at scar extending beyond normal outline of seed.
10. Kidney shaped or angular usually with deep concavity near scar (fig. XXXII)
.....*Medicago sativa* L. 50
10. Almost uniformly oval.
11. Usually over 2 mm. long, notch near one end.....*Melilotus alba* Desr. 49
11. Usually under 2 mm. long, notch near the center of one side.....
.....*Trifolium pratense* L. 46

I. 1 to 2 mm. long.
II. At least twice as long as broad.
1. Black or nearly so.
2. Rounded alike at both ends, bisymmetric when cut transversely; surface appearing granular but composed of rectangular markings .....*Hypericum perforatum* L. 58
2. Not rounded at both ends or bisymmetric when cut transversely.
3. Quite pronouncedly square in cross section.

4. Angles acute, base contracted to a sharp point.....
.....*Eupatorium perfoliatum* L. 82
4. Angles slightly rounded, apex slightly rounded, base not contracted to a sharp point..*Rudbeckia hirta* L. 91
4. Angles rounded, seed like a four sided pyramid with short white hairs, not over 1.6 mm. long (fig. IX)
.....*Galinsoga parviflora* Cav. 95
3. Not pronouncedly square in cross section.
4. Fluted cylindrical in shape, usually over 1.8 mm. long.....*Hieracium* sp. 117-118
5. Quite attenuate at base..*Hieracium scabrum* Michx. 118
5. Abruptly contracted at base.....
.....*Hieracium aurantiacum* L. 117
4. Not fluted cylindrical in shape.
5. Over 1.1 mm. long.
6. Pyramid or cone-shaped with numerous short white hairs, pappus of chaffy bristles when present (fig. IX).....*Galinsoga parviflora* Cav. 95
6. Irregularly angled, surface not covered with hairs, no pappus, not reticulate, granular.....
.....*Plantago Rugelii* Dcne 78
5. Under 1.1 mm. long..*Glyceria nervata* (Willd.) Trin. 10
1. Not black or nearly so.
2. Nearly triangular in cross section.
3. With more than 3 prominent longitudinal striations (fig. XXX).....*Daucus Carota* L. 61
3. With but 3 prominent longitudinal striations.
4. Rich dark reddish, comparatively short.
5. Surface shining, angles distinct, sides nearly equal
.....*Rumex obtusifolius* L. 14
5. Surface dull, angles sometimes rounded, especially toward base.....*Polygonum aviculare* L. 16
4. Light brown, comparatively long, a shallow groove on one side, angles often hairy.....*Poa pratensis* L. 9
2. Not triangular in cross section.
3. Appearing white or light gray.
4. Thin and wafer-like, white with darker markings..
.....*Achillea Millefolium* L. 96
4. Background dark with 10 heavy white longitudinal ridges, not wafer-like (fig. XXVIII).....
.....*Chrysanthemum Leucanthemum* L. 99
3. Not appearing white or light gray.
4. Thin, wafer-like, cream-colored.
5. With a slight margin around the edge, translucent, "usually under .9 mm. long" B., sometimes slightly over 1 mm.....*Erigeron annuus* (L.) Pers. 83
5. Without noticeable margin with noticeable hairs, "usually over .9 mm. long." Beal.....
.....*Erigeron canadensis* L. 84

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4. Not thin, wafer-like and cream-colored.
  5. Angular or angles distinct.
    6. Very light straw-colored with about 9 rounded longitudinal ridges (fig. XXVIII)..... .....*Anthemis arvensis* L. 98
    6. Not light straw-colored.
      7. Distinctly square in cross section, very dark brown to black.
        8. Angles acute, base drawn into an attenuate point almost uniform in diameter except at base, pappus capillary, over 1.8 mm. long.. .....*Eupatorium perfoliatum* L. 82
        8. Angles not acute, pappus of chaffy bristles, surface hairy, not uniform in diameter, tetrahedonal, under 1.8 mm. long (fig. IX).. .....*Galinsoga parviflora* Cav. 95
      7. Not distinctly square in cross section.
        8. Plano-convex or concavo-convex in cross section.
          9. With 2 to 5 rows of frail spines on convex surface, longitudinal ends not attenuate, lines pronounced (fig. XXX)..... .....*Daucus Carota* L. 61
          9. Without longitudinal rows as above, ends attenuate.....*Digitaria sanguinale* Scop. 1
        8. Not plano-convex or concavo-convex with longitudinal striations.
          9. Cone shaped, with numerous gray hairs and pappus of chaffy bristles (fig. IX) .....*Galinsoga parviflora* Cav. 95
          9. Not cone shaped or hairy.
            10. With longitudinal ridges or angles.
              11. Comparatively thick set, dark, see description....*Verbena urticaefolium* L. 68
              11. Comparatively slender and light (fig. XI).....*Verbena hastata* L. 69
            10. Without marked *longitudinal* striations.
              11. Surface finely reticulate..... .....*Plantago major* L. 77
              11. Surface granular, not reticulate..... .....*Plantago Rugelii* Dcne. 78
  5. Not angular.
    6. Surface shining.
      7. Not at all uniform in diameter.
        8. Uniform in shape, one end pointed, usually with a whitish triangular appendage (fig. XXV).....*Prunella vulgaris* L. 71
        8. Not uniform in shape.

9. With a slight groove down each side, variously colored. *Sisymbrium officinale* Scop. 41
9. Without a groove on each side, surface finely reticulate..... *Plantago major* L. 77

7. Quite uniform in diameter.
8. With a slight groove down each side, variously colored.. *Sisymbrium officinale* Scop. 41
8. Without a groove on each side.
9. Almost circular in cross section, surface with rectangular markings..... ..... *Hypericum perforatum* L. 58
9. Not circular in cross section, surface finely reticulate..... *Plantago major* L. 77

6. Surface not shining.
7. Compressed.
8. With a groove on each side.
9. Groove indicated by a loop or double line, not over 1.3 mm. long (fig. XL)..... ..... *Capsella Bursa-pastoris* L. Medic. 39
9. Groove indicated by a single line.
10. Groove running out on to one end..... ..... *Sisymbrium officinale* L. Scop. 41
10. Groove ending on the face of the seed, broader..... *Lepidium ruderale* L. 38
8. Without a groove on each side.
9. Surface finely reticulate.. *Plantago major* L. 77
9. Surface not reticulate.
10. Light straw-colored and spindle-shaped.
11. Scar on one side extending about one-half length of seed, seed not under 1.6 mm. long.... *Digitaria sanguinale* Scop. 1
11. Scar on one side short, not more than one-fourth length of seed, seed not over 1.2 mm. long .... *Agrostis alba* Schrad. 7
10. Not light straw-colored or spindle-shaped.
11. Not at all kidney-shaped, usually dark brown to black, *Plantago Rugelii* Dcne. 78
11. Usually kidney-shaped and usually not dark brown to black.
12. With a short distinct elevation near scar reaching beyond the normal outline of the seed (fig. XXXIII) ..... *Medicago lupulina* L. 51
12. Without a short distinct elevation at scar extending beyond normal outline of seed.

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13. Kidney-shaped or slightly angular, usually with a deep concavity near scar (fig. XXXII)..... .....*Medicago sativa* L. 50
13. Almost uniformly oval.
14. Usually over 2 mm. long, notch near one end..... .....*Melilotus alba* Desr. 49
14. Usually under 2 mm. long, notch near center of one side..... .....*Trifolium pratense* L. 46

7. Not compressed.
8. With about 10 ribs composed of tubercle-like projections, broader at apex, dark (fig. XXVII).....*Anthemis Cotula* L. 97
8. Without ribs composed of tubercle-like projections.
9. With about 9 prominent rounded longitudinal ridges, light straw-colored (fig. XXVIII).....*Anthemis arvensis* L. 98
9. Without 9 prominent rounded ridges.
10. Surface finely marked throughout.
11. Diameter nearly uniform, ends rounded with rectangular markings..... .....*Hypericum perforatum* L. 58
11. Diameter not uniform, reticulated longitudinally, irregularly shaped... .....*Plantago major* L. 77
10. Surface not finely marked throughout.
11. Dark brown.
12. Cone- or tetrahedral-shaped, usually with white hairs, broadest at one end (fig. IX)..... .....*Galinsoga parviflora* Cav. 95
12. Irregularly shaped, no hairs, not broadest at one end..... ..... *Plantago Rugelii* Dcne. 78
11. Light straw-colored, spindle-shaped.
12. Scar on one side extending at least one-third length of seed, seed usually over 1.7 mm. long..... .....*Digitaria sanguinale* Scop. 1
12. Scar on one side extending only one-fourth length of seed, seed under 1.4 mm. long..... .....*Agrostis alba* Schrad. 7

II. Not twice as long as broad.
1. Distinctly triangular in cross section.

2. With more than 3 longitudinal ridges, greenish in color (fig. XXX).....*Daucus Carota* L. 61
2. With 3 or less longitudinal ridges.
3. Equilateral or very nearly so.
4. Without pointed ends, angles sometimes indistinct, never over 2 mm. long.....*Rumex Acetosella* L. 15
4. With pointed ends, angles very distinct, apical end sharp pointed, basal end blunt pointed, shining.
5. Rarely under 2 mm. long, less shining than the following species, apex more acuminate.....*Rumex obtusifolius* L. 14
5. Usually about 2 mm. long, shiny, apex not attenuate, angles dip slightly just back of apex (fig. XXXVI).....*Rumex crispus* L. 13
3. Not equilateral.
4. Light straw-colored.
5. Over 1.5 mm. long.....*Setaria viridis* K. Braw. 4
5. Less than 1.5 mm. long.....*Agrostis alba* L. 7
4. Not light straw-colored.
5. Seed coat loosely fitting, irregularly shaped, brick red (fig. XII).....*Oenothera biennis* L. 59
5. Seed coat tightly fitting.
6. Surface granular, usually black.....*Plantago Rugelii* Dcne. 78
6. Surface finely striate.
7. Usually over 1.8 mm. long with a remnant of calyx at one end, other end quite acuminate, striations quite straight.....*Polygonum aviculare* L. 16
7. Usually under 1.8 mm. long, irregularly shaped, striations wavy, variously colored.....*Plantago major* L. 77

1. Not triangular in cross section.
2. Black or nearly so.
3. Round with a wing.
4. Wing very broad, seed very thin.....*Linaria vulgaris* Hill. 76
4. Wing narrow, seed thick.....*Spergula arvensis* L. 27
3. Without a wing.
4. Shining markedly.
5. Slightly pointed at opposite ends, fairly thick edges rounded.....*Polygonum Persicaria* L. 17
5. Not pointed at opposite ends.
6. Calyx persistent, when rubbed off seeds slightly flattened on both faces.
7. One side flattened more than the other, margin not always rounded, slight curved groove on one side.....*Chenopodium album* L. 22

7. Equally flattened or convex, margin rounded, no groove but a slight notch present (fig. VII) .....*Chenopodium hybridum* L. 21
6. Calyx not markedly persistent, seeds strongly convex on both faces.
7. Seeds almost perfectly round in outline, rarely over 1.2 mm. long....*Amaranthus graecizans* L. 26
7. Seeds not perfectly round in outline, broadly ovate.
8. Angle at margin very marked, usually larger than next following species..... .....*Amaranthus hybridus* L. 25
8. Angle at margin indistinct, usually smaller (fig. XLI).....*Amaranthus retroflexus* L. 24

4. Not shining, dull.
5. Not at all round, angles quite distinct.
7. Surface with fine reticulations..*Plantago major* L. 77
6. Surface granular, not reticulate..... .....*Plantago Rugelii* Dcne. 78
5. Round or nearly so.
6. Surface covered with concentric rows of small tubercle-like projections giving a granular appearance, somewhat kidney-shaped..... .....*Saponaria officinalis* L. 34
6. Surface quite smooth.
7. Broadly notched at one side, not lens-shaped.. .....*Trifolium hybridum* L. 48
7. Notch slight, somewhat lens-shape.
8. With calyx present, lines of calyx run transversely entirely across the seed; with calyx off a "groove runs from the side to the notch".....*Atriplex patula* L. 23
8. With calyx present, lines of the calyx run radially; with calyx off, a groove runs from notch to center of the face of the seed.... .....*Chenopodium album* L. 22

2. Not black or nearly so.
3. Shining surface.
5. Over 1.8 mm. long.
5. Pronouncedly compressed, broad oval or kidney-shaped.
6. Black .....*Polygonum Persicaria* L. 17
6. Not black.....*Trifolium pratense* L. 46
5. Not pronouncedly compressed.
6. Usually with a whitish appendage at base, not flattened on one side (fig. XXV)..... .....*Prunella vulgaris* L. 71
6. Flattened slightly on one side, without appendage .....*Setaria viridis* L. Beauv. 5

4. Under 1.8 mm. long.
5. Light straw-colored, slightly flattened on one side, see description .....*Panicum capillare* L. 2
5. Not light straw-colored.
6. With a pronounced groove running up one side and onto the end....*Sisymbrium officinale* Scop. 41
6. Without a groove.
7. Surface finely reticulate.....*Plantago major* L. 77
7. Surface finely pitted.....*Barbarea vulgaris* R. Br.

3. Surface dull.
4. Surface covered with pits or tubercle-like projections easily visible with hand lens.
6. Shallow pitted or granular.
7. Granular, usually flesh-colored, light.....
.....*Cuscuta arvensis* Beyrich 65
7 Distinctly pitted, not flesh-colored.
8. Irregularly flattened; convex at scar with a slight concavity on either side near scar (fig. XXXIX) ....*Barbarea vulgaris* R. Br. 42
8. Not flattened markedly, scar not as noticeably convex, duller in color than the next preceding .....*Brassica nigra* L. Koch. 40
6. Deeply pitted in longitudinal rows (fig. XXIV) ..*Verbascum Thapsus* 74 or *Verbascum Blattaria* 75
5. Surface with tubercle-like elevations.
6. Round to short kidney-shape.
7. Distinctly red in color, usually not over 1.2 mm. in diameter, somewhat angular with about 5 rows of tubercles on each face (fig. XXXIV) .....*Stellaria media* L. Cyril. 29
7. Not usually distinctly red in color, over 1.2 mm. in diameter.
8. Background of seed brown, rarely reddish, not angular, short kidney-shaped.....
.....*Silene noctiflora* L. 33
8. Background of seed distinctly black or dark gray, somewhat more angular and larger than next preceding.....*Lychnis alba* Mill. 32
6. Seeds not at all kidney-shaped, ridges not distinctly tubercled (fig. XXIV).....
Verbascum Thapsus L. 74 or *Verbascum Blattaria* L. 75
4. Surface not pitted or tubercled.
5. Wafer-like, thin especially at the edges.
6. With longitudinal lines (fig. XXX).....
.....*Daucus Carota* L. 61
6. Without longitudinal lines.
7. Without projections on the margin, usually narrowly winged with a groove on each side .....*Arabis laevigata* Muhl. Poir. 43

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7. Usually winged and with at least 1 short curved projection on the margin, without grooves on the sides.....*Ranunculus abortivus* L. 36

5. Not wafer-like or thin at the edges.
6. With pronounced lateral ridges.
7. Distinctly reddish or dark brown in color.
8. Regularly 3-angled, not always equilateral.. .....*Polygonum aviculare* L. 16
8. Not regularly 3-angled.
9. Oval, flattened with 2 marked longitudinal striations (see description)..... .....*Setaria viridis* L. Beauv. 5
9. Irregularly shaped, angles distinct (fig. XII) .....*Oenothera biennis* L. 59
7. Not distinctly reddish in color.
8. With about 9 distinct rounded longitudinal ridges, broadest at apex, light straw-colored usually (fig. XXVI)....*Anthemis arvensis* L. 98
8. Not broadest at apex and with 9 distinct rounded longitudinal ridges.
9. Irregularly shaped, black when fully ripe.
10. Surface finely reticulate..... .....*Plantago major* L. 77
10. Surface not reticulate, granular..... .....*Plantago Rugelii* Dcne. 78
9. Regularly shaped.
10. With more than 2 longitudinal ridges (fig. XXX).....*Daucus Carota* L. 61
10. With not more than 2 longitudinal lines.
11. More than 1.5 mm. long..... .....*Setaria viridis* L. Beauv. 5
11. Less than 1.5 mm. long..... .....*Agrostis alba* L. 7

6. Without pronounced lateral ridges.
7. With two small oval white scars placed end to end near one end of the seed (fig. XX).. .....*Nepeta Cataria* L. 70
7. Without scars as above.
8. Ellipsoidal in cross section and almost circular in greatest outline, usually with a narrow lighter colored wing, angle at edge distinct.....*Spergula arvensis* L. 27
8. Not as above.
9. Markedly angled and irregular in shape.
10. With a distinct groove on the faces of the seed, quite strongly flattened.
11. Groove extending entire length of seed .....*Sisymbrium officinale* (L.) Scop. 41

11. Groove not extending entire length of seed, quite flattened, pointed at one end.....*Lepidium ruderale* L. 38
10. Without a distinct groove on the faces.
11. Seed coat loosely fitting or wrinkled, brick red, angles very distinct and acute (fig. XII)..*Oenothera biennis* L. 59
11. Seed coat not noticeably wrinkled, angles more rounded.
12. Not black when ripe, usually flesh-colored and granular.....
.....*Cuscuta arvensis* Beyrich 65
12. Black when fully ripe.
13. Surface reticulated.....
.....*Plantago major* L. 77
13. Surface not reticulated.....
.....*Plantago Rugelii* Dcne. 78
9. Not markedly angled, quite regular in shape.
10. Almost round, both faces concave, a slight notch at one edge, the opposite edge thicker.....*Malva* sp. 56-57
11. Dark reddish brown usually under 2 mm. in diameter.....
.....*Malva rotundifolia* L. 56
11. Light grayish in color, usually over 2 mm. in diameter.....
.....*Malva moschata* L. 57
10. Not round, with both faces concave as above.
11. With a distinct longitudinal groove starting at the narrow end of the seed and extending at least one-half length of seed.
12. Surface finely dotted or pitted, distinctly gray-brown, somewhat shiny; inserted here as a check (fig. XXXIX).....
.....*Barbarea vulgaris* R. Br. 42
12. Surface not finely dotted or pitted.
13. Groove extending entire length of the seed and running on the end, broader .....
.....*Sisymbrium officinale* Scop. 41
13. Groove not extending entire length of seed.
14. Groove double or looped, under 1.2 mm. long (fig. XL).....
Capsella Bursa-pastoris A. Medic. 39

14. Groove single extending one-half to two-thirds length of seed, flattened and over 1.3 mm. long..*Lepidium ruderale* L. 38

11. Without a distinct longitudinal groove.

12. At least one end sharply pointed, oily in appearance, usually with an accompanying scale.

13. Usually over 1.2 mm. long, pointed each end.....*Phleum pratense* L. 6

13. Usually under 1.2 mm. long, pointed at one end, scar less than one-fourth length of seed .....*Agrostis alba* Schrad. 7

12. Ends not sharp pointed, appearance not oily, never with accompanying scale.

13. Surface very finely pitted.

14. Light flesh-colored, often with 2-3 adjacent flattened areas... .....*Cuscuta arvensis* Beyrich 65

14. Not light flesh-colored or as above.

15. Irregularly flattened, somewhat shiny (fig. XXXIX) ....*Barbarea vulgaris* R. Br. 42

15. Not markedly flattened, duller than the next preceding.... .....*Brassica nigra* L. Koch. 40

13. Surface not finely pitted.

14. Surface granular.

15. Without notch near the scar, dark colored..... .....*Cuscuta Gronovii* Willd. 63

15. Light flesh-colored, often with flattened areas clearly marked by angles..... ....*Cuscuta arvensis* Beyrich 65

14. Surface not granular, usually with a notch near the scar.

15. With a short distinct elevation near the scar, reaching beyond the normal outline of the seed, scar on the side nearer one end, usually over 1.5 mm. long (fig. XXXIII) ....*Medicago lupulina* L. 51

15. Without a short distinct elevation near the scar, reaching beyond the normal outline of the seed.
16. Under 1.5 mm. long with scar and notch at one end, scar at the deepest part of notch and small.
17. Dark green to black.....
..*Trifolium hybridum* L. 48
17. Light yellowish to yellow-brown .....
.....*Trifolium repens* L. 47
16. Over 1.5 mm. long, notch not usually at one end.
17. Kidney-shaped or angular, usually with a deep concavity near the scar (fig. XXXII).....
.....*Medicago sativa* L. 50
17. Almost uniformly oval.
18. Usually over 2 mm. long, notch toward one end, rarely in this section of the key....
...*Melilotus alba* Desr. 49
18. Usually under 2 mm. long, notch near the center of one side....
Trifolium pratense L. 46

I. 0 to 1 mm. long.
II. Surface shining.
III. With numerous curved forked ridges or wrinkles.....
.....*Potentilla monspeliensis* L. 44
III. Without numerous curved forked ridges or wrinkles.
1. Surface pitted; with fine rectangular markings or with rows of minute rounded elevations.
2. Surface minutely pitted, oval, brown scar at narrowest end (fig. XXXIX).....*Barbarea vulgaris* R. Br. 42
2. Surface with concentric rows of fine tuberculate projections, black, round or short kidney-shaped.....
.....*Portulaca oleracea* L. 35
2. Surface with fine rectangular markings, cylindrical, dark brown to black.....*Hypericum perforatum* L. 58
1. Surface not pitted; with fine markings, or rows of minute rounded elevations.
2. Possessing a longitudinal groove running more than one-half length of seed.
3. Not black.

4. Long oval or irregular in shape with a groove running the entire length of the seed and onto the end.....*Sisymbrium officinale* Scop. 41
4. With a double or looped groove.....
.....*Capsella Bursa-pastoris* A. Medic. 39
3. Black or with slight brown cast at apex, pointed at both ends.....*Glyceria nervata* Trin. 10
2. Without a groove running more than one-half length of seed.
3. Thickest in the middle coming to a more or less acute angle at the edge, notch at scar very shallow.
4. Ovate, angle at edge more rounded.....
.....*Amaranthus retroflexus* L. 24
4. Round, angle at edge distinct, slightly smaller than next preceding.....*Amaranthus graecizans* L. 26
3. Angles at edges rounded, notch at scar quite marked.
4. Green to black.....*Trifolium hybridum* L. 48
4. Yellow to light brown.....*Trifolium repens* L. 47

II. Not shining.

III. With distinct forked curved wrinkles or ridges, light colored.....*Potentilla monspeliensis* L. 44

III. Without distinct forked curved wrinkles or ridges.

1. Surface with a longitudinal groove starting at one end, not pitted.
2. Groove looped or double, not running the entire length of the seed (fig. XL)..*Capsella Bursa-pastoris* A. Medic. 39
2. Groove not double but running entire length of seed....
.....*Sisymbrium officinale* Scop. 41

1. Surface without a longitudinal groove starting at one end.
2. Surface finely pitted or with numerous tubercle-like elevations.
3. Surface pitted.
4. Nearly cylindrical, one end smaller than the other, pits deep (fig. XXIV).....
.....*Verbascum Thapsus* L. or *Blattaria* L. 74
4. Not cylindrical.
5. A slight groove at one end, grayish brown (fig. XXXIX) .....*Barbarea vulgaris* R. Br. 42
5. Without a groove at one end.
6. Pits quite distinct under a microscope; with quite a pronounced concavity at the scar usually under .9 mm. long.....
.....*Cuscuta epithymum* Murr. 64
6. Pits not markedly distinct; more granular in appearance; not markedly concave at scar but with more marked flattened areas than in next preceding species....*Cuscuta arvensis* Beyrich 65
3. Surface with concentric or eccentric rows of tubercle-like projections.

4. Dark gray or black when mature.
   5. Dull lead-colored, almost circular, not over .5 mm. in diameter.....*Arenaria serpyllifolia* L. 28
   5. Almost shiny black, more ovate in shape, over .5 mm. in diameter.....*Portulaca oleracea* L. 35
4. Distinctly reddish to red-brown in color.
   5. Over .8 mm. in diameter with 5-6 curved rows of minute tubercle-like projections on each face, dark (fig. XXXIV).....*Stellaria media* L. Cyril. 29
   5. Under .8 mm. in diameter with coarser tubercles, lighter.....*Cerastium viscosum* L. 30

2. Surface smooth, not pitted or tubercled.
   3. Flat, nearly circular without a noticeable notch but with a short projection on the margin and a narrow wing.....*Ranunculus abortivus* L. 36
   3. Not flat, narrow winged or circular.
      4. Dark brown to black, with an oily appearance, under .8 mm. in length, broadly oval.....*Eragrostis megastachya* Host. 8
      4. Not dark brown to black, usually over .8 mm. long.
         5. Nearly spherical, minutely pitted or with a distinct granular appearance.
            6. Pits quite distinct under a microscope, with a pronounced concavity at the scar, usually under .9 mm. long..*Cuscuta epithymum* Murr. 64
            6. Pits not markedly distinct, more granular in appearance, not markedly concave at scar but with more marked flattened areas than the next preceding species.
               .....*Cuscuta arvensis* Beyrich 65
         5. Not spherical, pitted or with granular appearance.
            6. Somewhat shield-shaped with a notch at apical end, a slight groove on each side of the notch.
               7. Green to black.....*Trifolium hybridum* L. 48
               7. Yellowish to light brown..*Trifolium repens* L. 47
            6. Not shield-shaped or with grooves.
               7. Surface finely hairy, flattened oval, tapering at the base.....*Erigeron canadensis* L. 84
               7. Somewhat spindle-shaped with a scar at the broader end extending not over one-fourth length of the seed.....*Agrostis alba* Schrad. 7

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